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*W. H. Keetley*  
ANNALS  
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OF

# SURGERY

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A MONTHLY REVIEW OF SURGICAL SCIENCE AND PRACTICE.

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EDITED BY

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# ANNALS OF SURGERY.

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## ON THE REMOVAL OF ENORMOUS VESICAL CALCULI BY THE SUPRA-PUBIC ROUTE WITH REPORT OF A RECENT SUCCESSFUL CASE.

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**P**ATIENT. æt. 55 years, from Renovo, Pennsylvania, was admitted to the University Hospital May 4, 1889, with the following history:

He had been troubled with symptoms of vesical irritability for 26 years, suffering severe pain during urination, chiefly at the end of the penis. He had always been a moderate drinker, usually of beer; he was a constant sufferer from dyspepsia.

Examination of urine: Specific gravity 1012, reaction alkaline, small amount of albumen, accounted for by the pus present; no sugar.

Microscopically: Abundant bladder cells, pus, and triple phosphate. No casts.

Sounding clearly demonstrated the existence of a calculus in the bladder, and gave the impression that it was of moderate size, as the peculiar click was only to be elicited when the point of the sound was turned in a particular direction. On May 8 the patient was etherized and a lithotrite was introduced into the bladder. Repeated efforts were made either to seize or to crush the stone, but were unsuccessful, the points of the instrument seeming to slide over the surface of the stone and, always without taking hold. I remarked to those present that I was dealing either with an encysted calculus, or with one of the largest size,

<sup>1</sup>Read before the College of Physicians of Philadelphia, November 6, 1889.

or with both; that the stone was apparently a hard one, as not the smallest particle was brought out by the blades of the instrument, and that for these reasons the supra-pubic operation was indicated. This I at once proceeded to perform.

In the absence of a rectal colpeurynter, a half dozen small sponges fastened to silk threads were inserted into the rectum. Ten ounces of boracic acid solution were injected into the bladder, bringing it well up toward the umbilicus. A piece of rubber drainage tube was tied around the penis to prevent the exit of fluid. I then opened the bladder in the usual way, making a small incision immediately above the pubes. On dividing its interior wall with the knife, the point of the latter impinged directly upon the stone, which was another evidence of its unusual size. On putting my fingers into the bladder I found it was nearly filled with an enormous calculus occupying the *bas fond*, and covered over at least three-fourths of its surface with folds of mucous membrane held tightly in place by strong bands of lymph. It was with great difficulty and only by the exercise of considerable force, that I was able to strip this covering from the stone. I finally succeeded in doing so, using the pulps of my fingers so as to do as little violence as possible to the tissues. The wound in the bladder wall and that in the soft parts were enlarged upward, the stone seized with the forceps, and, finally, delivered. Two large drainage tubes were introduced through the wound into the bladder, and two superficial sutures were placed in the soft parts. The bladder was washed out every three hours with a saturated solution of boric acid with 1:5000 bichloride of mercury. The bichloride caused an erythema around the wound and phenol sodique 1 to 10 of water was substituted. One drainage tube was removed May 22, the remaining tube May 27. A soft catheter was passed through the urethra and retained in position. On June 3, the wound was almost healed and the catheter was removed. A small amount of urine found its way through the wound. On the following day the temperature rose to 101.8°. There has been no movement of the bowels for some days. The constipation was overcome by a dose of Rochelle salts, and the catheter was replaced June 7. The temperature at once fell to normal, and remained so. No urine passed through the wound after June 10.

On June 14, the catheter was finally removed, and the patient left the hospital entirely well June 17. A careful examination of his urine at this time revealed nothing abnormal.

The patient made a practically uninterrupted recovery, although the length of time the disease had existed, the close adhesions of the stone



to the bladder walls, its enormous size, necessitating not only a larger wound than usual, but also causing considerable damage to the edges of the wound during the removal of the stone, all led me to feel great anxiety as to the result of the case. The stone weighed at the time of its removal, nearly  $9\frac{1}{2}$  ounces (4550 grains); its greatest circumference was  $8\frac{1}{2}$  inches, and its transverse circumference  $7\frac{1}{2}$  inches. The patient sat up on the 25th day, and the wound was entirely closed at the end of  $4\frac{1}{2}$  weeks.

I have to-day received a letter from him, in which he says that he has never been better in his life.

This case seems to me of special interest from three points of view:

1. The absence of fatal kidney disease in a case of such long standing, and in the presence of such an extreme source of urethral obstruction, frequent urination, etc.
2. The encysted condition of the calculus.
3. Its unusual size and weight.

I am quite aware that many cases have been recorded in which enormous calculi have been found after death in the bladder of patients who died from intercurrent disease, or from conditions not directly involving or dependent upon the urinary tract.

In the majority of instances, however, it is probable that when a stone attains a weight of more than two or three ounces and is carried for any length of time, it produces a condition analogous to that which I found in the case of a patient from whom I removed post-mortem a calculus weighing 532 grains.

He came to me with a history of long standing vesical calculus, which was easily confirmed on examination, and which also showed that the stone was probably of extremely large size; I therefore decided upon the supra-pubic operation, to which the patient consented. He was extremely weak, and had a profuse dysenteric diarrhœa.

The night before the day fixed for the operation he suddenly died, and the autopsy, which I conducted the following afternoon, showed a condition of the kidneys which made it marvellous that he lived so long. The entire secreting structure had

disappeared, and the organs were transformed into multilocular sacs containing enormous quantities of muco-pus. The ureters were dilated to almost the calibre of the small intestine. The bladder contained a calculus weighing 532 grains. The origin of this dilatation of the ureters and kidneys in such cases is of great interest, as no appreciable obstacle to the entrance of urine into the bladder is usually discoverable. It seems probable that in some instances the dilatation is brought about by the frequent contraction of the walls of the bladder, each act of this character temporarily interrupting the flow of urine through the vesical end of the ureter. This, taken in conjunction with the extension of inflammation from the bladder by continuity, probably explains the condition. An operation would have been certainly fatal, and I was thankful to have escaped the additional risk of death during the use of ether. The urine was so loaded with vesical debris that the condition of the kidney could not be ascertained with any certainty.

A brief review of the history of some of the cases in which excessively large stones were operated upon will show at once that the patients were almost invariably in a condition which rendered surgical interference surely and more or less rapidly fatal. As Keyes says: "Surgical works on this subject teem with rare and curious cases of calculi of great size and weight, the largest of which will be found to have been taken from dead bodies, and the next in size pretty uniformly to have brought about fatal results by their removal during life."

Among examples of unsuccessful attempts to extract large stones may be mentioned the case operated upon by Vitellius and recorded by Fabricius Hildanus, in which the stone weighed 22 ounces.

Geyer details one in which the fragments weighed 10 ounces.

Charles Preston mentions one taken from a priest, in 1690, and preserved in the Charité Hospital of Paris. It weighed 51 ounces, but the patient died before the operation was completed. Borellus describes one of 18 ounces extracted by Quesnotus. Marteau removed one of 14 and another of 12 ounces. Mr. Birch extracted one of 16 ounces from a man in

St. Thomas' Hospital; Deguise one of 31 ounces. Graefe, of Berlin, extracted one of 21 ounces; LaMotte, Vidal and Eller all mention examples of 12 ounces. In all those cases the patients died in from one to ten days. In a case of Sir Astley Cooper's, in which the stone weighed 16 ounces, the patient survived only 4 hours and in the case of Mr. Dalrymple, of Norwich in which the operation was abandoned before its completion, and the patient died in three hours, the weight of the calculus was upward of 12 ounces. Mr. Erichsen reported a case (*Lancet*, 1885) of a primipara in whom a large tumor was found obstructing the outlet of the pelvis, and necessitating craniotomy. A month later a stone was removed by the vesicovaginal operation. It weighed  $5\frac{1}{2}$  ounces, and measured 8 inches in the long and 6 inches in the short circumference. The patient died in eight days, and at the autopsy extensive disease of the kidneys was found, the right being converted into a mere cyst while the left was in a state of chronic pyelitis with great dilatation of the ureter.

Sir James Earle reported (*Lancet*, 1853) the case of Sir Walter Ogilvie, Baronet, of Dundee, who, at the age of 23, became paralyzed from the effect of a blow on the back. Twenty years later Mr. Benjamin Bell diagnosed stone, and recommended extraction, but the operation was declined. At the age of 53, the patient's sufferings became so violent that he determined to have it extracted.

In consultation with Mr. Cline, the operation of suprapubic lithotomy was thoroughly considered, and concluded to be "uncertain and dangerous, because the bladder, thickened and exquisitely irritable, could not be further distended with fluid, and the stone, although so large, had not raised it sufficiently high to obviate the danger of wounding the peritoneum and penetrating into the cavity of the abdomen. The usual lateral operation was, therefore, judged to be the only safe and probable means to be attempted." This was accordingly performed, but it was found impossible either to seize the stone in the forceps or to crush it and extract it piecemeal. The patient died 10 days later, and a stone was found weighing 44 ounces, and completely filling the bladder and the bony pelvis. Earle

was at one time shown a calculus weighing  $18\frac{1}{2}$  ounces, extracted by Cheselden. The patient died the following morning.

Mr. T. Holmes has recorded (*Trans. Path. Soc.*, 1870, vol. xxi. p. 267) the case of a calculus weighing 25 ounces, removed after death from the bladder of Sir Thomas Adams, a baronet, who died at Sprowston Hall, near the city of Norwich, during the reign of Charles II. The stone was of uric acid, and measured  $12\frac{1}{2}$  inches in its longitudinal circumference. Sir Thomas was able to be up and about until he met with an accident. He died at 81 years of age. The stone is now in the museum of St. Thomas' Hospital, London, of which institution he was president about the year 1662.

In the museum at Cambridge there is a 32 ounce calculus, taken from a woman who died about the same time. Mr. de Morgan describes two large calculi now in the Canterbury Museum, removed after death from the same patient, and weighing together  $22\frac{1}{2}$  ounces.

Mr. Holmes has also reported (*Trans. Path. Soc.*, London, 1874, vol. xxv, p. 181) a case in which unsuccessful attempts were made at both lithotripsy and lithotomy, and the patient died the day following the latter attempt. A stone weighing 3,620 grains was found filling the bladder and the prostatic urethra. It was 3.8 inches in length, 2.8 inches wide and 2.6 inches thick. After all the soft parts had been cleared away from the pelvic bones, it was found just possible to push this stone out from the pelvis through its lower outlet.

Mr. Robert Hardey records (*London Medical Gazette*, 1829, vol. iii., p. 569) the case of a man, æt. 66 years, from whose bladder he, after death, extracted a stone weighing  $27\frac{1}{2}$  ounces avoidupois, its greatest circumference being  $15\frac{1}{2}$  inches.

Sir Henry Thompson reports (*London Lancet*, 1857, vol. ii., p. 474) the case of a patient, æt. 46 years, from whom, after death, a calculus was removed weighing 12 ounces, and measuring  $9\frac{1}{2}$  inches in its transverse diameter, and  $10\frac{1}{2}$  inches in its greatest longitudinal diameter. The nucleus was composed of uric acid, but the external layers contained urate of

ammonium and phosphatic laminæ. He had urinary symptoms since he was æt. 15 years. Sir Henry Thompson remarked that when he came under his care, about 9 months before his death, the idea of extraction was not entertained because the stone was found to fill the bladder completely. In a case recorded by Mr. Williams, a uric acid calculus, which weighed 25 ounces, and measured  $10\frac{1}{2}$  inches in its short circumference and  $12\frac{1}{2}$  inches in its long circumference, was removed, after death, from the bladder of a gentleman, æt. 81 years.

Dr. Augustus Browne records (*Trans. Path. Soc.*, London, 1868, vol., xix. p. 277) the case of a man, æt. 42 years, who had symptoms of stone in the bladder for 25 years, having been afforded relief only by drinking an extraordinary mixture of gin and beer. He died with symptoms of uræmia. The bladder was found contracted upon 3 calculi, the total weight of which was  $1\frac{1}{4}$  pounds less 20 grains. Externally they seemed to be composed of triple phosphate.

Charles Monod has reported (*Bulletin de la Societe de Chirurgie*, Paris, 1881, p. 762) the removal of a stone weighing 1,950 grains, by suprapubic lithotomy, in which case, the patient having nearly recovered, but a small fistulous orifice remaining unhealed, 1 or 2 injections of tincture of iodine were used, being thrown into the small suppurating cavity situated behind the abdominal wall and communicating with the fistula. This was followed by erysipelas, and the patient died on the 40th day after the operation. The same surgeon records another case in which he extracted a stone 90 millimetres in length, 75 millimetres in width, and 58 millimetres in thickness, weighing 346 grammes, or about 5,200 grains. The patient died on the 5th day.

These cases sufficiently illustrate the history of the exceedingly large stones which have been mentioned in surgical literature as having been found after death, or as having been the object of unsuccessful surgical attack during life.

2. The second point to which I have alluded is the incarceration of the stone by means of such firmly organized lymph and by such a projection of the mucous membrane around about it that it practically lay in a cavity of its own, communicating

with the bladder by means of the aperature through which a portion of its convex surface protruded. The mode of formation of these cysts containing calculi is variable. In the majority of patients of the age of this one, it has always seemed to me probable that the condition was brought about primarily by enlargement of the prostate causing vesical hypertrophy with distention, and with the protrusion of the mucous membrane between the fibres of the detrusor, which gives rise to the well-known "sacculated bladder" of old people. Cross mentions a case in a man, *æt.* 84, where such a sacculus held a gallon.

These cysts thus formed have no muscular fibres, and, of course, no power of completely evacuating their contents, although they may do so partially by aid of the abdominal muscles. A certain amount of "residual urine," therefore, always remains in them, decomposing, throwing down a sediment, and setting up a catarrh, the mucus of which binds together the crystals and sedimentary deposit, forming the nucleus for the stone. In this instance, however, the symptoms date so far back into middle life (beginning when he was *æt.* 29 years) that this explanation hardly seems entirely satisfactory, and it appears more probable that the cyst was formed by the gradual sinking of the stone, as it grew, into a pocket made by its own weight, the hypertrophied and thickened mucous membrane rising above its borders and becoming fastened to it by lymph-bands.

According to Keyes, an encysted stone is either partially within the bladder and partly encysted, the neck of the cyst forming the obstacle to removal, or the orifice of the cyst is so small that to all intents and purposes the calculus is extravescical.

For the former set of cases, if the stone be of moderate size, and if the condition be discovered during a perineal lithotomy, after the part projecting into the bladder has been removed, or before, in some cases, the operator endeavors with his finger-nail, or a director, a searcher, a scoop, or other elevator, to dilate or slightly tear the neck of the cyst and work out the calculus. In this manœuvre, pressure upon the hypo-

gastrium or through the rectum may be of great assistance. If moderate manipulation fails to dislodge the stone, a curved, probe-pointed, long bistoury may be used with great caution upon the finger as a guide, to cut moderately the constricted edge of the neck of the cyst in one or more places. Such use of the knife involves risk, and it rests with the operator to decide according to the circumstances of each case whether to assume the risk, or to resort to supra-pubic section.

In the case of a large pouch connected with the bladder, and containing a small stone, the neck of the pouch may be dilated with the finger or small forceps, and the stone reached.

When the stone is practically outside of the bladder, or in a dilated ureter, some operators prefer to leave it untouched. Thompson acted in this way in the presence of a stone in the ureter. It is plainly the surgeon's duty to cut scantily in such cases.

That the incarceration of a calculus adds greatly to the difficulties of its extraction has always been recognized by lithotomists.

Mr. James Miller, Professor of Surgery in the University of Edinburgh; described (*Monthly Journal of Medical Sciences*, 1848, p. 574) the removal of two stones, one of which, the size of an egg, was easily extracted, but the second was so encysted that great difficulty was experienced in seizing it, and the soft parts adherent to it had to be carefully stripped from it with the tip of the forefinger before it could be freed and removed. The patient died about a month after the operation from Bright's disease and pyelitis, and an abscess of large size was found in the right kidney.

Various proposals exist for dealing with encysted and sacculated stones. Littré advised seizing hold of the stone and cyst in the way described, and using it roughly, with the object of bruising the soft parts so as to cause suppuration in them, and disintegration of them; and with the hope of the stone (if not itself broken) becoming loosened during the suppurative stage, dropping into the bladder, and thence being extracted at another time.

Garengot, with a bistoury, divided the neck of the sac, and then used forceps. Peyronie, LeDran, Marechal and others, have trusted to catching hold of the projecting part of the stone, and pulling violently, so as to detach it from its adhesions. Desault employed a concealed knife, or "coupe-bride," or "kystotome," for dividing the cyst. Among the older writers some have advised the stone to be left undisturbed, in hopes that the wound would heal, and that the patient would be left little worse, if no better, than when he was found.

Scheutzer (*Medical, Chirurgical and Anatomical Cases*, London, 1758) details the case of a clergyman, æt. 60 years, who for twenty years had felt a pain in the urethra with some obstruction in making water. Stone being diagnosed the operation for "its removal was performed according to the great apparatus." The operation was extremely tedious and difficult, but the stone was finally removed, after more than an hour's efforts. It was encysted and projected from the bladder into the prostatic urethra. It weighed five ounces. The final result is not stated.

Dr. Newbigging reported (*Monthly Journal of Medical Sciences*, 1848, p. 690) a case of encysted stone in which the adhesions had to be stripped from it with the finger in the same manner before its extraction could be effected. The stone was of large size but its weight was not given. The patient recovered.

Mr. Fergusson reported (*Transactions of the Pathological Society of London*, vol. vii, p. 84) a case in which a small stone having been recognized and crushed, the patient died 20 days later. A stone the size of an orange was found at the autopsy in a cyst at the right side of the bladder immediately behind and above the prostate gland. The opening communicating with the cavity of the bladder was about the diameter of a sixpence. The patient had suffered with urinary symptoms for twenty-six years. Mr. Fergusson remarked that the specimen was interesting from the great size of the stone, from the length of time it probably existed in this situation, from the slight irritation it had caused, and, lastly, from the rareness with which calculi are found in this precise locality.



Mr. Henry Lee presented to the Pathological Society of London (*The Lancet*, March 29, 1862, p. 328) a calculus for the removal of which median lithotomy had been performed. The stone was found to be impacted and immovable and could not be grasped by the forceps. Portions were broken off and at length were removed by the scoop. They weighed altogether nearly four ounces. The patient died three or four days afterward.

Mr. Erichsen reported (*The Lancet*, 1853, vol. i, p. 56) a case of encysted calculus in a patient who had had severe symptoms of stone in the bladder for several years. On several occasions Mr. Erichsen and his colleagues had heard the characteristic sound while the patient was being examined in the wards, but when he was placed upon the operating table, they failed to find it. He died about three years from the time he first came under observation, and a cyst was found upon the right side of the bladder containing two calculi, but the opening of the cyst was only large enough to admit the point of a middle-sized catheter. Mr. Erichsen congratulated himself upon having adhered to the rule never to cut for stone unless the presence of the calculus shall have been distinctly made out by percussion with the staff a few minutes before the operation. He adds: "The case which we have this day to bring before our readers offers a beautiful illustration of the soundness of the above mentioned caution handed down to us by our forefathers, for the post-mortem showed very plainly that though there was really a stone in the bladder, none of the means at our command could have accomplished its extraction even with a very large incision." Like most of the authors I have quoted, he does not seem even to have taken into consideration the supra-pubic operation.

Mr. W. Cadge, in an article on sacculation of stone in the bladder (*The British Medical Journal*, October 2, 1875, p. 418), has called attention to the dangers of lithotritry in such cases resulting from an injury to the walls of the bladder during the crushing, or the attempts at crushing.

3. As to the unusual size and weight of the calculus.

The stones larger and heavier than this which have been successfully extracted are very few :

Le Cat has recorded, 1774 (*Philosophical Trans.*, London, vol. xi. p. 238), a successful operation on a boy, æt. 12 years, of a removal of a stone which filled the entire bladder, but does not give either its weight or dimensions.

In 1818, Charles Mayo, Esq., of Winchester, operated upon a man, æt. 28 years, and extracted a stone of 14 ounces and two drachms, avoirdupois; it measured  $8\frac{1}{2}$  inches in its smallest circumference, by rather more than 10 in the largest, and broke into several big pieces in the attempts to extract it.

Mr. Dickinson, of England, successfully removed, from a man, æt. 62 years, a calculus of a globular shape, composed chiefly of phosphate of lime, and which weighed 11 ounces. It broke into several fragments, which were taken away piecemeal. The operation was followed by sloughing of the rectum, and when the case was reported, several months afterward, a small fistulous opening still existed between this cavity and the bladder.

Mr. Earle, in his "Remarks on the Danger of Extracting Large Calculi" (*Medico-Chirurgical Transactions*, London, 1821, vol. ii., p. 69), says: "The following are the largest successful cases which I have met with: One 15 ounces in weight, and  $4\frac{3}{4}$  by  $3\frac{1}{2}$  inches in diameter, extracted in 1746, by Mr. Harmer, of Norwich, related in Gooch's *Surgical Observations* p. 54. The patient survived, but the wound never healed. One of 13 ounces 30 grains in weight,  $3\frac{1}{2}$  inches in diameter, and 8 inches in circumference, operated on by Klein, with perfect success (*Pract. Anisch. der bedenten; Chir. Oper.*, p. 32). Klein likewise refers to a case related in Mursinna's *Journal f. die Chirurgie*, vol. vi. p. 94, in which a stone of 12 ounces and 2 drachms in weight was successfully removed."

Ambrose Paré mentions the case of a confectioner operated on in 1570, by John Collo, where the stone weighed 9 ounces and was  $3\frac{1}{2}$  inches in diameter. (*Lib.* 25, *ch.* 19). Tolet mentions a case of a stone 10 ounces in weight and  $3\frac{3}{4}$  inches in diameter, which was happily extracted, and the patient was recovering from the effects of the operation when an abscess formed in the kidney from the presence of another calculus the patient died on the 9th day after the operation.

Of the prodigious number of cases on which Cheselden operated, the three largest stones successfully extracted weighed 12, 10 and 8 ounces. Mr. Earle adds: "Without citing any more authors, it will be sufficient to state that, as far as my researches into this subject have hitherto led me, very few instances of success are recorded where the stone exceeded 7 or 8 ounces."

Sir Astley Cooper, in an article on "The Size of Human Calculi" (*The Lancet*, 1826, vol. i.), said: "The largest stone I ever saw extracted without its being broken (at the same time the patient surviving), is one that was taken from a person at the Norwich Hospital; it weighed 8 ounces."

A very remarkable case of suprapubic lithotomy, though hardly to be classed with the successful cases, occurred in 1837, in the practice of Professor Uytterhoeven, Surgeon to St. John's Hospital, Brussels. A man, æt. 39 years, a native and resident of Brussels, had labored under vesical disease nearly 27 years, when he was lithotomized. He survived the operation 8 days. The calculus, which weighed upward of 2 pounds, was of gourd-like figure, and was accurately moulded to the shape of the inside of the bladder, being nearly 7 inches in length, upward of 4 inches in breadth at the broadest part, and nearly  $2\frac{1}{2}$  inches in thickness. It had a rough, tuberculated surface, and appeared to consist of a number of thin, friable lamellæ. The walls of the bladder were indurated, and an inch thick, except at the point corresponding to the summit of the concretion, where they were completely worn down to the peritoneal coat. They contained several purulent depots and fistulous passages. An immense abscess occupied the left iliac fossa. The small intestine and the mesentery were highly inflamed.

Dr. Rae has reported (*British and Foreign Medical and Chirurgical Review*, 1844) the case of a man, æt. 40 years, who had symptoms of stone for 30 years. The bladder was opened through the perineum by the usual method; the finger introduced into the bladder felt the stone, and an attempt was made to seize it with the forceps. This was found to be impossible, on account of the firm contraction around it and the thickened coats of the bladder.

The patient was much exhausted, and it became necessary to desist after an hour and 40 minutes. The wound was kept open, and seven months later Mr. Ferguson crushed and extracted the stone, which weighed nearly 8 ounces. The patient recovered.

Mr. Bullen, of Ipswich, records (*Lancet*, 1848) a case of the removal of a calculus weighing 7 ounces from a girl, æt. 14 years. It was broken into many pieces before it could be removed. The patient, at the time it was reported, was progressing well.

Dr. Dudley reports (*Southern Medical and Surgical Journal*, 1850) a case of a youth, æt. 15 years, from whom a calculus weighing 9 ounces, and measuring 11 inches in its greatest circumference, was successfully extracted by the lateral operation. The extraction was followed, however, by sloughing of the bulbous portion of the urethra, together with the whole of the accelerator urinæ muscles and a large portion of the perineal connective tissue.

In a table of 96 cases of vesical and urethral calculus operated on by Professor George E. Post, of Beirut, Syria, the largest weighed 1875 grains, or less than 4 ounces, and the case resulted fatally. (*Medical Record*, 1877, p. 469.)

In 131 cases of stone in the bladder operated on in South Carolina, and collected by Dr. Francis L. Parker (*Transactions of the South Carolina Medical Association*, 1878, p. 37), the largest stone removed in one operation weighed 8 ounces, and the next  $4\frac{1}{2}$  ounces; none of the others were over 2 ounces.

Dr. C. T. Gardner (*Medical Record*, vol. xiv., 1878) removed a calculus which weighed  $12\frac{1}{2}$  ounces, measured in its several diameters,  $3\frac{3}{8}$  inches and  $2\frac{1}{4}$  inches, and had for a centre a small oxalate calculus, the periphery being made up of phosphates. The operation for its removal was commenced with the lateral section, as the instruments on hand were insufficient to crush it *in situ*. The patient, æt. 48 years, did well after the operation; a rectal fistula which formed from sloughing spontaneously closed.

Dr. Mettauer, of Virginia, is said to have removed a calcu-

lus weighing 16 ounces by the lateral operation ("Eve's Surgical Cases"), but so far as I know, no details of the case have been published.

Gross and Agnew each allude to a case in which Dr. Dunlap, of Ohio, removed a stone of 20 ounces after fragmentation. The patient lived 3 years after the operation. After quoting some of the above-mentioned cases, Gross adds:

"Although the above cases clearly show that a stone, even of large size, may occasionally be successfully extracted, yet it is equally certain that they must be regarded as so many exceptions to the rule, rather than as the rule itself. Most generally, indeed, the patient dies either from exhaustion during the operation, or from the effects of inflammation a short time afterward."

A very few words will suffice as to the diagnosis and operative treatment of such a calculus as this. A stone of this size and shape, freely movable in the bladder, could undoubtedly be seized by the lithotrite and measured in its small diameter, but it is hardly probable that it would be caught in the direction of its length in the one examination which it is customary to make for the purpose of measurement before deciding upon the particular operation to be performed. If the bladder were much contracted, it could not be grasped in its long diameter at all. The existence of a cyst-wall nearly covering it, greatly reducing the area over which the characteristic click of the searcher is obtained, preventing the lithotrite from seizing the stone with any firmness, and rendering it almost immobile, of course adds greatly to the difficulty of diagnosis. Bimanual examination, with a finger in the rectum and another over the hypogastrium, might be of use in persons with very attenuated abdominal walls, but even these would scarcely convey an accurate conception of the dimensions of the calculus. It is probable that the true size of such calculi will generally be discovered in the future as in the past—during the performance of the operation intended for their removal.

As to the choice of that operation there can scarcely be two opinions, supra-pubic cystotomy being so evidently the only available method, and the one to be employed at once when,

as in this instance, the character of the stone is disclosed during the attempt at litholapaxy.

It would, perhaps, be more useful to consider the duty of the surgeon who, having opened the perineum by either the median or lateral section, finds that he is dealing with a calculus of this description. Under these circumstances, the abandonment of the perineal route being imperative, the high operation should be performed, either at once, if the patient is in good condition and well fitted to bear shock, or, if that is thought inadvisable, as soon as the perineal wound has fairly well granulated, the patient then having the benefit of the drainage by that route without the danger of septic absorption.

# AN EXPERIMENTAL INVESTIGATION INTO THE ANTISEPTIC VALUE OF IODOFORM.

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IN the autumn of 1887 I commenced a series of experiments with the object of corroborating or otherwise those which had been recently published by Rovsing and Heyn<sup>1</sup>. The results arrived at by the experimenters tended to show, as is now well known, that iodoform, as an antiseptic dressing, was entirely useless; that it has no germicidal action, and, indeed, that it might, by its application to a wound, be the immediate means of conveying infection. The experiments given below will be seen to corroborate to some extent in their results those previously arrived at by Heyn and Rovsing, and which many observers since (Sattler, Tilanus, Baumgarten, De Ruyter, Lübbert, Jeffries and others) have likewise to some extent verified. More strictly, however, the result of my own experiments may be said to support those arrived at by Sattler and Tilanus, who found that in some cases iodoform had an inhibitory effect upon the growth of certain microbes.

These various experiments by myself and others have been carried on in the laboratory and in a manner which can hardly be considered as a fair parallel to the use of the drug in the wards. Notwithstanding the adverse assertions of experimentalists, surgeons still maintain the antiseptic value of iodoform, and in one form or another it is at present used in large quantities as a wound application. It was this double feeling

<sup>1</sup>Fortschritte der Medicin, 1887, 5, 33

which I had myself, of its apparent value in the wards and of its apparent uselessness in the laboratory that led me to try another series of experiments which might approach more in their likeness to the clinical use of the drug.

These experiments, which will be subsequently given in detail, were made with pus taken from acute inflammatory processes; and to the pus so obtained different quantities of iodoform were added. Agar-agar plate cultivations were then made of the pus thus treated and the results compared with those made of pus to which no iodoform had been added. The great difference between the original experiments, as performed by Heyn and Rovsing, and these latter will be seen to lie in the fact that in the former pure cultivations of microbes were made use of, while in the latter microbes were such as they are to be found in pus. There really is a wide difference between the two. To express it numerically one might say that in using pure cultivations we were employing microbes by the million, whereas in using pus we have them simply by the hundred or the thousand. The addition of iodoform might, therefore, be incapable of producing any effect upon microbes existing in such large numbers, while it might possibly have some retarding or perhaps some marked deleterious effects upon microbes existing—as they do in pus or on a wound—in comparatively small numbers. It was this idea that led me to try the series of experiments which have ended in showing that iodoform may, under conditions, act as a germicide, although its action as such is very weak.

#### FIRST SERIES OF EXPERIMENTS.

These experiments were made with pure cultivations of anthrax spores, anthrax bacilli, micrococci prodigiosi and staphylococci pyogenes aurei.

##### A. With Anthrax Spores:

1. Silk threads with anthrax spores were mixed well with iodoform and pressed on to the surface of sloped Koch's beef-peptone jelly, itself previously slightly sprinkled with iodoform.



As a control experiment a similar thread, non-iodoformized, was placed upon the surface of another tube of jelly.

At the end of seven days there were no signs of growth in the iodoformized tube, but abundant in the control tube.

At the end of fourteen days marked development had taken place in the iodoformized tube.

2. A silk thread with anthrax spores was embedded in iodoformized beef-peptone jelly.

At the end of seven days marked development had taken place around the thread.

At the end of twenty-one days there was considerable liquefaction of the jelly.

### B. With Anthrax Bacilli:

1. Anthrax bacilli were planted upon the oblique surface of the tube of iodoformized agar-agar jelly.

Anthrax bacilli also planted upon the surface of non-iodoformized jelly for control experiment.

On the second day the control showed signs of rapid growth.

On the third day one iodoformized tube showed marked signs of development.

2. A tube of iodoformized beef peptone jelly was "stabbed" with anthrax bacilli. A similar tube of pure jelly also "stabbed" for control experiment.

On the second day marked signs of liquefaction were seen in the iodoformized jelly.

At the end of 21 days both control and iodoformized jelly showed an equal amount of liquefaction.

### C. With Micrococcus Prodigiosus:

1. Some of the pure cultivation of the microbe taken from the surface of agar-agar jelly was well mixed with iodoform so as to form a brick-dust colored paste.

A beef peptone jelly tube was "stabbed" (impfstich) with some of this mixture.

After one day liquefaction of the jelly was seen to have commenced, and the microbe continued to develop

2. Some of the same paste was spread upon a potato.

A feeble growth took place at the room temperature.

2. *a.* After the paste had been on the potato for 8 days, a beef-peptone jelly was "stabbed" with it.

At the end of one day growth was observed and rapid liquefaction ensued.

3. Some of the pure cultivation was spread upon the surface of a potato, previously dusted with iodoform. The potato was kept at the room temperature.

After a few days, growth began to show itself in several places on the surface of the iodoform, subsequently extending from each centre; growth proceeded, however, for only two or three days, darkening in color and then becoming stationary. Four weeks later some of the growth was inoculated into a beef-peptone jelly tube. Within two days rapid development took place.

The potato was again dusted on its surface thoroughly with iodoform, covering thereby completely the growth also. It was placed in the incubator and kept at a temperature of 37°C.

At the end of 7 days three beef-peptone jelly tubes were stabbed from the surface layer on the potato.

Rapid development of the microbe, with liquefaction of the jelly ensued.

4. Iodoform was mixed with potato so as to form a kind of paste having a distinct yellow tinge.

Some pure cultivation of the microbe was smeared upon the surface of the paste.

After 1 day signs of growth were seen.

After 2 days further growth ceased. The pigmentation deepened, subsequently assuming a dark brownish-red color.

4. *a.* After 8 days some of the dark reddish material from the surface of the potato was planted upon the oblique surface of agar-agar jelly.

Within 24 hours rapid development was seen.

5. The same experiment as 4, only instead of being left at the room temperature, the inoculated iodoform potato-paste was placed in the incubator and kept at a temperature of 37°C.

At the end of 24 hours no growth was observed. Experiment 4 was repeated in the following way for better comparison of the effect of difference of temperature upon rapidity of growth:

Three potato-pastes were made; two were iodoformized, the third was left for control.

Upon the surface of each an equal quantity of the microbe was smeared:

<i>Placed in Incubator.</i>	<i>Left in the Room.</i>	<i>Control left in the Room.</i>
(37°C.)	(15.5°C.)	(15.5°C.)
On 2nd day. No growth and becoming quite dark.	No growth and very slightly darker.	Slight signs of growth.
End of 1st week. The growth has turned a faded purplish color. Around the margin is an almost colorless stratum. Taken out of incubator and left in the room.	Signs of growth. Color maintained.	Marked signs of growth.

End of 3d week. Growth appears to have progressed almost equally in all three, although slightly more extensive in control.

Koch's beef-peptone jelly tubes were "stabbed" from each.

On the following day equal and rapid liquefaction of the jelly, with growth was taking place along the "stab" in each tube.

6. A tube of Koch's beef-peptone jelly was iodoformized and "stabbed" with the microbe.

Within 24 hours rapid liquefaction was taking place.

7. Two tubes of the agar-agar jelly were iodoformized and the microbe planted upon their oblique surfaces. Two non-iodoformized tubes also inoculated and used as control. One control and one iodoformized tube placed in the incubator, the other two left in the room.

After 24 hours no development seen in either iodoformized tube, but extensive growth in both controls.

After 3 days rapid growth was taking place in the iodoformized tubes.

#### D. Experiments with *Staphylococcus Pyogenes Aureus*:

1. Two tubes of agar-agar jelly were iodoformized and two of the pure jelly were used as control. Upon the oblique surface of all four some pure cultivation of the microbe was planted and the tubes placed in the incubator.

Within 24 hours no growth had taken place in the iodoformized tubes but abundant development in the controls.

After the 3d day some growth was observed in the iodoformized tubes. A little of the growth was planted upon the oblique surface of two agar-agar jelly tubes and the latter then placed in the incubator.

Within 24 hours abundant growth had taken place in each tube.

2. A pure cultivation of the microbes on agar-agar was taken and mixed with iodoform so as to form a golden colored paste. Some of

the paste was planted upon the oblique surface of three agar-agar jelly tubes and the latter placed in the incubator.

After 24 hours a very slight development was seen in one tube.

After 48 hours extensive development in the other two.

After the 4 days the three tubes showed each abundant development.

3. A similar paste to that in experiment 2 was made. Two of Koch's beef-peptone jelly tubes were "stabbed" with some of the paste and exposed to the room temperature. One jelly tube was "stabbed" with a pure cultivation of the microbe and kept as control.

On the 2d day slight liquefaction was seen in the control; nothing in the other two tubes.

On the 3d day indication of liquefaction in both iodoform tubes, much more in one than the other.

On the 4th day liquefaction proceeding rapidly in both iodoform tubes, but development in the control has advanced beyond that of the other two tubes.

*Conclusions to be Deduced from the Above Experiments.*—The experiments with anthrax spores and anthrax bacilli showed that the effect of adding iodoform to the cultures was to retard growth but not to prevent it, as in all cases rapid and continuous development sooner or later took place.

In these experiments with anthrax bacilli my own results confirm those previously arrived at by Neisser and Buchner.

The experiments with micrococcus prodigiosus show also that the presence of iodoform in the cultures has a retarding effect, and further that this retardation is prolonged when the temperature is raised.

Some of these experiments would also seem to support Jeffries' theory that retardation may in many cases be due to the purely mechanical effect of the iodoform separating the microbe from its soil. Especially would this seem to be the case where iodoform has been previously dusted upon the surface of the medium which is to have implanted upon it the microbe.

In no case was growth entirely inhibited. The experiments with staphylococcus pyogenes aureus showed that the addition of iodoform, either to the microbes themselves or to the soil upon which they were to be implanted, had the effect of re-

tarding growth, but in no case did the microbes appear to be deleteriously affected.

These experiments with *staphylococcus pyogenes aureus* do not agree in their results with those obtained by Neisser who states that in his experiments with this microbe iodoform in no way affected its growth.

## SECOND SERIES OF EXPERIMENTS.

This series of experiments in which pus from acute abscesses (with one exception for special reasons) and from suppurating surfaces (non-tuberculous) was used in place of pure cultivations of microbes, was commenced in July, 1888, and continued up to the present date.

In all cases of experimentation pus was obtained in sterilized tubes and then when possible, the latter with the contained pus were at once conveyed to the incubator and maintained at the temperature of the body. Prior to placing in the incubator the tubes were covered with small India rubber caps to prevent any watery evaporation.

The iodoform used was the finely powdered form.

The first few experiments were done in the following way: By means of a platinum loop needle a small streak of pus was drawn upon the oblique surface of a tube of agar-agar jelly. This was then placed in the incubator and watched. Certain quantities of iodoform were added to measured quantities of pus and the pus thus iodoformized planted upon agar-agar jelly in the same way. By this means it was possible to compare the effect of iodoform upon the development of any existing microbes. In theory this mode of experimenting seemed, at first, likely to prove of value in testing the antiseptic worth of iodoform; practically, however, it turned out otherwise. Results were sometimes conflicting and the method was not sufficiently sensitive. For these reasons, therefore, I gave up any further experiments in this way and adopted the much more certain though much more tardy and difficult means of making in all cases plate cultivations.

Before, however, giving the result of these latter I will detail

one experiment of the former method which gave a positive result and led me to believe that in principle I was possibly on the right basis for arriving at a just conclusion of the real antiseptic merits of iodoform.

The pus was obtained from a case of pyæmia.

July 9. Upon the sloped surface of two agar-agar jelly tubes some of the pus was planted and the tubes placed in the incubator. Five grains of iodoform were added to 5i of pus and placed in the incubator.

July 10. Abundant development in both inoculated tubes, the surface of the jelly in each tube being completely covered by growth.

July 11. Two agar-agar jelly tubes were inoculated with the iodoformized pus (i. e., 2 days after the insertion of the iodoform).

July 12. Development along the streak of inoculation seen in both tubes. Two fresh agar-agar jelly tubes inoculated with the iodoform pus (i. e., 3 days after the insertion of the iodoform).

July 13. Development in both tubes slightly less than in the previous experiment. Two fresh agar-agar jelly tubes inoculated with iodoformized pus (i. e., 4 days after the insertion of the iodoform).

July 14. Development in both tubes considerably less than in previous experiment. The colonies could now be easily enumerated. Two fresh tubes inoculated (i. e., 5 days after insertion of iodoform).

July 15. Result: No development. Two fresh tubes inoculated (i. e., 6 days after insertion of iodoform).

July 16. Result: No development.

The one omission in this experiment was not making finally a control cultivation to see whether in the original pus microbes were still alive and in abundance on July 16, when the iodoformized pus showed that they were all dead. That, however, the original pus was still actively septic and contained living microbes, the following experiment carried on only two days later unmistakably proved.

In this second experiment, 2 grains instead of 5 grains of iodoform were inserted into one drachm of the pus.

At the end of 1 week, some of this iodoformized pus was planted upon the oblique surface of agar-agar jelly and placed in the incubator. Development subsequently hatched as luxuriantly as if no iodoform had been added.

Many of these experiments were done according to this

method, but for reasons above given they were abandoned. Those now to be described were commenced in January, 1889. It was not, however, until March that any real progress was made, for while in the previous two months numerous experiments had been made, they had all been rendered useless by the constant contamination of the plate by bacterium termo. It was sometime before the actual cause of this contamination was detected; and revealed, notwithstanding the inconvenience it had caused, the interesting and instructive fact of the tenaciousness to life of the microbe of decomposition. It was always noticed that the development of the microbe took place on the under surface of the jelly, that is to say, between the jelly and the glass surface, thus suggesting that it was probably not associated with the jelly but with the plate. The plates had always been soaked for a short time in a 1 to 1,000 bichloride of mercury solution prior to being heated up to, and frequently above, a temperature of 150° C. It was not until the plates were left for a much longer period in the bichloride solution that a complete sterilization was effected. These microbes thus seemed to resist high temperature but could not withstand prolonged immersions in bichloride of mercury solutions.

The experiments will now be given in the order in which they were made.

*Experiment A.*—The pus was taken from a case of empyema. It presented a faint smell of the bacillus of green pus.

February 26. Agar-agar plate cultivations were made of the pus; one original and first and second attenuation. (The term "original," which will be frequently used, indicates the inoculation of a tube with a definite quantity of pus, as the case may be either iodoformized or not. A glass rod is taken with a piece of platinum wire welded into its extremity. The free end of the wire is loosely twisted or coiled so as to give it the appearance of a loose knot. This when dipped into the pus takes up a small drop. The advantage of using, for this purpose, a platinum needle is that it can be easily and rapidly sterilized in the open flame. Thus then what is understood by the original (O) is the tube of agar-agar jelly which contains a small drop of pus obtained by dipping this knotted needle first into the pus and then into

the jelly where it is well shaken about to ensure the pus with its contained microbes being scattered or diffused throughout the culture medium).

In 100 minims of pus 5 grains of iodoform were added (known as I<sub>5</sub>).

To another 100 minims 10 grains of iodoform were added (known as I<sub>10</sub>).

February 27. The plate cultivations of the pus show :

O (Original) Numerous green colonies ; smell like that of the bacillus of green pus,

1. Attenuation : Two whitish colonies.

2. Attenuation : No colonies.

Plate cultivations made of each of I<sub>5</sub> and I<sub>10</sub>.

February 28. The plate cultivations of both I<sub>5</sub> and I<sub>10</sub>, show a large number of colonies of green pus.

March 1. Plate cultivations made of I<sub>5</sub> and I<sub>10</sub> (i. e., three days after the insertion of iodoform).

March 3. Plate cultivation of I<sub>5</sub> shows about 11 small colonies, apparently none green. Plate cultivation of I<sub>10</sub> shows numerous minute colonies with no apparently green ones.

March 8. No development in either plate.

*Experiment B.*—This pus was obtained from a case of pelvic cellulitis.

March 29. An agar-agar plate cultivation was made of the pus. To a tube containing 50 minims of the pus, 5 grains of iodoform were added (I<sub>5</sub>).

March 30. The plate cultivation of the pus shows a number of colonies ; several large white and numerous small yellowish ones. They are not too numerous to be counted. A plate cultivation made of I<sub>5</sub>.

March 31. The plate cultivation of I<sub>5</sub> shows about 14 minute colonies.

April 1. Two plate cultivations made of I<sub>5</sub> (i. e., two days after the insertion of the iodoform).

April 2. The plate cultivations show one or two colonies. Two fresh plate cultivations made (i. e., three days after the insertion of the iodoform).

April 5. Each plate cultivation shows only one colony. This experiment was carried still farther and the pus which so far had been



rendered free from living microbes by the iodoform was inoculated from a pure cultivation of bacterium termo (I<sub>5</sub> B.T.).

April 4. Two plate cultivations made of I<sub>5</sub> B.T.

April 5. Each plate cultivation showed innumerable colonies of bacterium termo. Ten grains more of iodoform added to the tube (I<sub>15</sub> B.T.).

April 8. Two plate cultivations made of I<sub>15</sub> B.T. (i. e., three days after the insertion of the iodoform).

April 9. Both plates densely sprinkled with colonies of bacterium termo.

*Experiment C.*—The pus was taken from a large chronic abscess. Cover-glass preparations were made and stained by Gram's method, but no microbes were found.

May 8. Two "original" plate cultivations were made.

May 9. Both plate cultivations showed no colonies. The pus being thus proved to be free from pus microbes was experimented upon in the following way:

May 10. Four drachms of pus were inoculated with staphylococcus pyogenes aureus. A visible quantity of the microbe was taken from the surface of a pure cultivation on agar-agar jelly by means of a loop of platinum wire.

May 13. The four drachms of pus inoculated with staphylococcus pyogenes aureus was divided into three tubes. One tube contained 3ij (A); a second tube 5j (B); and a third tube 5j (B). An agar-agar plate cultivation was made of both Bs.

May 14. The plate cultivations of both Bs show extensive development of staphylococcus pyogenes aureus. To one B is added 10 grains of iodoform (Br<sub>10</sub>). To the other B is added 5 grains of iodoform (B<sub>5</sub>).

May 15. Plate cultivations made of Br<sub>10</sub> and B<sub>5</sub>.

May 16. Both plate cultivations of Br<sub>10</sub> and B<sub>5</sub>, show extensive development of staphylococcus pyogenes aureus.

May 17. Plate cultivations again made of Br<sub>10</sub> and B<sub>5</sub>.

May 18. The result of plate cultivations the same as on the 16th.

May 20. Plate cultivations again made of Br<sub>10</sub> and B<sub>5</sub> (i. e., six days after the insertion of the iodoform).

May 21. The plate cultivations show innumerable colonies of staphylococcus pyogenes aureus.

May 18. Plate cultivations were made of A to see if the organisms were still alive.

May 19. The plate cultivations of A show the entire surface of the jelly to be completely covered with innumerable colonies of staphylococcus pyogenes aureus. To A is added 20 grains of iodoform (A20).

May 20. Plate cultivations made of A20.

May 21. Plate cultivations made of A20 show innumerable colonies of staphylococcus.

May 22. Plate cultivations made of A20 (i. e., three days after the insertion of the iodoform).

May 23. The plate cultivations show innumerable colonies of staphylococcus pyogenes aureus.

*Experiment D.*—The pus was obtained from an acute inguinal abscess following a sore upon the foot. Cover-glass preparations made and stained after Gramm's method showed the existence of micrococci almost as numerous as if they had been taken from a pure cultivation of the microbe.

May 29. Agar-agar plate cultivations were made up to the third attenuation.

May 30. All four plates, including therefore the third attenuation, show innumerable colonies of the staphylococcus pyogenes aureus.

June 1. To about one drachm of the pus 20 grains of iodoform were added (I20). To another drachm 30 grains were added (I30).

June 3. Two agar-agar plate cultivations made, each of I20 and I30.

June 4. Both plates of I20 and I30 show innumerable colonies.

June 7. Plate cultivations made of I20 and I30 (i. e., six days after the insertion of the iodoform).

June 8. Both plate cultivations show innumerable colonies of the staphylococcus.

*Experiment E.*—The pus was obtained from a cellulitis about the ankle joint of a child, following a punctured wound of the sole of the foot caused by broken glass.

June 15. Three tubes containing about one drachm of pus were thus made use of: One was kept as a control (C). To another was added 20 grains of iodoform (I20). To the third was added 30 grains

of iodoform (I30). Agar-agar plate cultivations were also made of the pus non-iodoformized—Two originals (O) with a first and second attenuation.

June 17. One plate cultivation of O shows numerous colonies, the other O only three colonies.

The first attenuation shows two colonies.

The second attenuation shows no colonies.

Two plate cultivations made of control (C), one plate cultivation of I20 and one of I30.

June 18. The results of the plate cultivation are:

Both Cs show innumerable colonies.

I20 shows no colonies.

I30 ditto.

Plate cultivations again made of C, I20 and I30.

June 19. The results of the plate cultivations are :

C shows innumerable colonies.

I20 shows one colony.

I30 shows no colonies.

To the control (C) 15 grains of iodoform added (CI15).

June 20. Three plate cultivations made of CI15. Both I20 and I30 inoculated with bacterium termo (I20 B.T. and I30 B.T.).

June 21. The result of the three plate cultivations of CI15 shows no development.

Two plate cultivations made of CI15.

One plate cultivation made of I20 B.T.

One plate cultivation made of I30 B.T.

June 22. No development in plates of CI15 ; also no development in plates of I20 B.T. and I30 B.T.

June 24. Two plate cultivations made of I20 B.T. and one of I30 B.T.

June 25. All three plate cultivations show several colonies of bacterium termo.

*Experiment F.*—The pus was obtained from an abscess of the scalp of a child. Cover-glass preparations stained by Gramm's method several clumps of micrococci.

June 25. Agar-agar plate cultivations were made of the pus. One drachm of pus kept as control (C). To another drachm of pus is added 10 grains of iodoform (I10).

June 26. Results of plate cultivations of pus :

C shows complete clouding of the jelly with colonies.

First attenuation shows an almost countless number of colonies. Second attenuation shows about 75 colonies. The colonies are almost entirely those of *staphylococcus pyogenes aureus*.

Two plate cultivations made each of I10 and C.

June 27. Results of plate cultivations:

Both Cs show dense clouding of the surface of the jelly.

Both I10s show innumerable colonies but they are quite distinct and separable from each other.

Two plate cultivations made of I10.

To I10 is added another 10 grains of iodoform, making 20 grains in all (I20).

June 28. Both plate cultivations of I10 show much the same condition as on the 27th. Two plate cultivations made of I20.

June 29. Both plate cultivations of I20 show great reduction in the number of colonies, which are easily enumerable.

The conclusions to be drawn from these experiments may be summarized as follows:

*From Experiment A.*—The addition of 5 and 10 grains of iodoform respectively, to two separate quantities of  $1\frac{1}{2}$  drachm of pus caused the death of the bacillus of green pus and some other pus organisms present, in 9 days.

*From Experiment B.*—The addition of 5 grains of iodoform to a little less than a drachm of pus caused the death in 4 days of the comparatively few microbes of *staphylococcus pyogenes aureus* and *albus* present.

The further addition of 10 grains of iodoform after inoculation with *bacterium termo*, failed after 3 days, to have any effect upon the development of this saprophytic microbe.

*From Experiment C.*—The addition, respectively, of 5 and 10 grains of iodoform to two separate quantities of a drachm of pus inoculated with a comparatively large quantity of *staphylococcus pyogenes aureus* failed to have any effect after 5 days' action. Similarly the addition of 20 grains of iodoform failed after 3 days, to have any effect. In this experiment the quantity of the microbe inoculated appears to have converted the pus into what might be likened to a pus cultivation of the organism, so that the experiment might be classed with those where iodoform was tested with pus cultivation (vide first series of experiments).

*From Experiment D.*—The addition of 10 grains of iodoform to 1 drachm of pus showed after 3 days' action, considerable diminution in the quantity of the microbe present. The microbe was the staphylococcus pyogenes aureus, and although existing in large numbers it was not sufficient to withstand entirely the action of the iodoform.

*From Experiment E.*—The addition of 20 and 30 grains respectively to two separate quantities of a drachm of pus showed that after only 1 day's action of the iodoform, the microbes were killed. In this experiment the microbe was the staphylococcus pyogenes aureus. It existed in very small numbers, while the quantity of iodoform present was very large. The experiment also showed the almost complete powerlessness of iodoform on bacterium termo with which the iodoform tube had been inoculated.

*From Experiment F.*—The addition of 20 and 30 grains of iodoform respectively to two separate quantities of a drachm of pus failed to have any effect after 6 days' action of the drug. In the experiment, the microbe was the staphylococcus pyogenes aureus and existed in a very large quantity; indeed, approaching—as in experiment C—to what might be likened to a pus cultivation of the microbe.

*General Conclusions to be drawn from the Second Series of Experiments.*—These experiments would seem to prove that under certain conditions iodoform has a germicidal effect upon pyogenic microbes and no influence upon one putrefactive microbe—bacterium termo; that the only conditions which allow of this effect is the existence in large excess of iodoform or the presence in comparatively small numbers of the microbes.

Where the microbes are in abundance, some retarding influence appears to be exercised by iodoform upon their growth and even some diminution in the numbers which subsequently develop; but, if the number present be so large that the pus may approach to the condition resembling "pus cultivation" of the microbe, then the experiment resembles those of the first series and the result the same, *i. e.*, no germicidal effect is observed.

The general result then, of this second series of experiments is to show that iodoform has some distinctive power, and that

its supposed or acknowledged value in the wards is borne out by experiments in the laboratory.

It may fairly be assumed that where iodoform is added to a wound, it will be largely in excess of any microbes present and therefore precisely in the position in which the experiments seem to indicate its aseptic power lies. Indeed, it is quite probable that such conditions as existed in the first series of experiments are rarely found to exist naturally; that is to say, no open wound is ever in the position of having anything comparable to a pure cultivation of microbes upon its surface. So that practically, iodoform, when used clinically, is always applied largely in excess of the existing microbes, and therefore capable of exercising advantageously its antiseptic properties.

Many theories have been propounded by those who believe in the antiseptic power of iodoform, as to how this influence is exercised. By some Sattler,<sup>1</sup> Tilanus<sup>2</sup> the microbes are supposed to be directly attacked by it. By others, (DeRuyter,<sup>3</sup> Behring<sup>4</sup>), it is their products, the ptomaines which are influenced. By others again, (Friedlander,<sup>5</sup> Lübbert<sup>6</sup>) it is the wound surface itself, or the cells which are enabled to resist the deleterious effect of the microbes or the ptomaines. Still another theory has been advanced by Neudorfer<sup>7</sup> based on the supposition that microbes by their irritative action upon the nervous channels are the cause of inflammation, and that iodoform applied, acts as an antiseptic upon the sympathetic nerve fibres, rendering them insensible to any such irritative influence. Lastly, it has been supposed, Koenig,<sup>8</sup> Jeffries,<sup>9</sup> that the effect of iodoform is to dry up the secretion on the surface of wounds, and so, as it were, starve any microbes which may perchance have found access to, or already exist on, the part.

<sup>1</sup> Sattler, Ueber den Antiseptischen Werth des Iodoforms und Iodols. Fortsch. de Med., 1887, 5, 362.

<sup>2</sup> Tilanus, Ist Iodoform ein Antisepticum. Munch. Med. Wochensch, 1887, 34, 309

<sup>3</sup> De Ruyter, Report Sixteenth Congress of German Surgery. Central f. Chirurg, 1887, Beil.

<sup>4</sup> Behring, Ueber Iodoform und Acetylene. Deutsch. Med. Wochensch, 1887, 20, 422.

<sup>5</sup> Friedlander, Das Iodoform als Antisepticum. Fortsch. d. Med. 1887, 5, 129.

<sup>6</sup> Lübbert, Ueber das Verhalten von Iodoform zum Staphylococcus Pyogenes Aureus. Fortsch. d. Med., 1887, 5, 330.

I have no intention of discussing these various theories, the object of this paper is rather to give the practical results of some of my own observations and experiments. It is possible that some of these theories are more or less correct, and that propounded by DeRuyter and Behring would especially seem to be so. By experiments they unmistakably showed that ptomaines without organisms were capable of causing suppurations and that iodoform was able so to act upon the ptomaines as to prevent suppuration. My own experiments prove, I think, that iodoform has a distinct effect upon the microbes themselves, but such effect is only produced when the drug is largely in excess of the organisms.

Surgeons who use iodoform with any real faith in its antiseptic properties do so in large quantities, as it is the only proper use of the drug which brings about the good results that occur.

As compared with many other much more powerful antiseptics, the special value of iodoform must rest upon its prolonged action. Solutions are absorbed, or carried away by the discharges, whereas iodoform remains as an almost permanent application. So that it is not infrequent to find, on the removal of a dressing, some weeks after its original application, the iodoform still on the surface of the wound, and as active—if the pungency of the odor may be accepted as a criterion of the continuance of its antiseptic power—as when first used.

In concluding this paper, I must acknowledge my great indebtedness to my friend Dr. Thos. H. Bryce, who has extended me much valuable assistance in carrying out many of the experiments. I am also indebted to various writers on the subject of iodoform in the pages of the *ANNALS OF SURGERY* for the useful information obtained from them as also for the many references therein given which I have been able to make use of and consult.

<sup>1</sup> Neudorfer, Gegenwart u. Zukunft der Antiseptic und ihr Verhältniss zur Bacteriologie, Klinische Zeit. und Streitfragen, Wien, 1887.

<sup>2</sup> Koenig, Ueber die Zulassigkeit des Iodoform als Wundesbandmittels etc, Therap. Monatshefte, 1887, 4.

<sup>3</sup> Jeffries, The Antibacterial Action of Iodoform. Amer. Jour., Med. Soc., January, 1888.

# CONTRIBUTION TO PULMONARY SURGERY, WITH REPORT OF FOUR CASES OF PNEU- MOTOMY<sup>1</sup>.

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BY pneumotomy is meant an incision into the lung tissue. It is singular that for the first lesson on the subject, we must go back to the Father of Medicine, Hippocrates, who lays down the following rules: When, after pneumonia, an abscess forms, there is fever, dry cough, dyspnœa, swelling of the feet \* \* \* you shall make an incision as low as possible on the side where the swelling and pain are; you shall incise between the ribs with a curved bistoury, first the integument, then with a straight bistoury, wrapped up in a cloth to within a finger nail's length of the end, plunge the instrument into the lung." Then he advises the introduction of a tent into the opening, letting out the pus morning and evening, and washing out the cavity through a canula with warm wine and oil, and at last putting in a lead canula, which he shortened from time to time as the cavity closed in. What is this but the modern treatment, which for so many ages gave way to other means, and which lay buried until our day when happily with the great boon which antiseptic surgery has given to mankind, our surgical field has enlarged to such an extent that there is no organ in the body beyond its sphere.

The sound advice of Hippocrates seems to have been a dead letter for centuries until Purrrman, in 1692,<sup>2</sup> recommended surgical interference in pleuritic effusions, in wounds of the chest, in empyema and purulent effusions.

Next comes Baglavius<sup>4</sup> who, although he never operated himself, wrote the following masterly article, which I will quote in full. "Phthisis ab ulcero pulmonum, vulgo pro incurabili

<sup>1</sup>I am under great obligations to Professor Fenger, of Chicago, for literature on the subject.



derelinquitur, eoquia, ut aiunt, tale ulcus internum est, et occultum, nec ut alia externa ulcera modificari, et a pure abtergi potest; sed quare non id agunt medici ut investigent ulceris situm, eoquo detecto sectionem inter costas instituant, ut medicamenta introduxi possint rationem sane non agnosco? Elapso septennio cum esse Patavii vir quidam accepit vulnus in dextra thoracis parte ad pulmonem usque penetrans: quod vulneris genus quamvis lethale fit, chirurgus tanem solertissimus sectionem inter costas fecit per longitudinem fere sex digitorum, ut situm vulnerati pulmonis detegeret; eo digitur detecto per vulneraria sirigantionibus et turum dilis ntroducta, elapsis duobus mensibus perfecte cicatrigavit. Eamdem propemodum sedulitatem tentare deberent practitantes in curando pulmonum phthisicorum ulcere, ne tanto artis dedecore, catalogus morborum incurabilium quotidie in immensum augeat. Doctores medici? Mentis vires assiduis cogitationibus et usu accuntur; socordia vero, et desperatione fraguntur."

In 1763 Barry<sup>5</sup> reported many cases of pulmonary cavities which he had incised with the happiest results.

About the same time Shayse<sup>6</sup> wrote; "If there are pleuritic adhesions on the level of a cavity, incise into the cavity with a lancet. If there is great suppuration introduce a tent into the opening. After such an incision, many a person has lived a long while with a running fistula.

1783 Protean recommended the opening into the lung tissue, and then the plunging of the locker until the abscess cavity was reached.<sup>7</sup>

Callisen, in 1788,<sup>8</sup> advocates an incision and with the finger in the pleural cavity to detect the abscess, and make an incision into the lung tissue.

Now we come down to our own century, and we find that in 1812 Richerand<sup>9</sup> considers the operation as established beyond discussion. He even goes so far as to advocate an exploratory incision, and he relates the opening of a pulmonary abscess by Faye, in 1797.

The following year Jaymes<sup>10</sup> observed a similar case. Zang<sup>11</sup> reported 7 cases of pneumotomy in 1818; and Vincent favored opening and drainage; all his cases were successful.

In 1824<sup>12</sup> Masse performed the same operation.

We next come to the celebrated operations of Krimer in 1830<sup>13</sup> which created such a sensation all over France. Both of his patients, however, died; one six months after the operation, the other a short time after he was operated upon.

In 1830 McLeod, in 1831 Breschet<sup>14</sup>, and in 1839 Clæssens reported the opening of pulmonary cavities.

Then follows the case of Hastings and Storks, and of Herff, in 1844, Brichetan, in 1851, and Collins, in 1855; and 13 operations of the celebrated surgeon Greaux<sup>16</sup> which were unfortunately not successful.

We now find a blank space in literature, as if the operation had fallen into disrepute or had never been known; until Mosler<sup>16</sup>, in 1873, proposed and practiced it.

To him and to G. Bull, of Christiana, belongs the honor of having brought to such a successful point the operation as it is to-day.

In late years the work of W. Koch,<sup>17</sup> Cartaz,<sup>18</sup> Albert,<sup>19</sup> Martell,<sup>20</sup> and the works of Fenger, Hollester and Billington in this country have greatly added to the literature of this interesting subject.

The indications for the operation are 1, pulmonary abscess; 2, gangrene; 3, pulmonary cavities; 4, for the removal of foreign bodies.

Pulmonary abscesses following pneumonia and bronchitis are rapidly fatal unless interfered with early.

Pulmonary gangrene unless circumscribed is too rapidly fatal to call the surgeon's attention; it is only in localized gangrene that we can interfere, as is clearly shown in Case 1.

Large pulmonary cavities cause a continual bronchial irritation, and may cause a fatal hæmorrhage; therefore, the advisability of opening them and facilitating their cicatrization.

Foreign bodies may cause abscesses and even gangrene, and their removal is urgently demanded.

*Modus operandi.*—In all my operations pieces of one or more ribs were excised in the following manner: After laying the rib bare, an incision was made in the middle line through the periosteum, which was reflected on both sides; then a Parker's retractor was inserted between the periosteum and the rib, and on the retractor the rib was divided with a sharp pair of Liston's

forceps. This is a far safer and quicker method than with the chain saw; the sharp forceps will cut the rib as neatly as a chain saw and more rapidly. The removal of a section of a rib varying from 3 to 8 centimeters, or the so-called Estlander operation, is a very successful procedure when the cavity is large, as it brings down the chest wall and soon closes to the lung, thereby facilitating its closure. No washing out of the cavity was resorted to as it caused severe coughing in my first case. Strict antisepsis and frequent dressing was all that was found necessary. The nearest point to a cavity was the one usually selected, unless covered by the scapula or pectoral muscles. Drainage is indispensable; rubber, glass or gauze drainage giving the best results.

CASE I. *Gangrene of Lung Following Pneumonia*.—Thomas B., æt. 32 years, Irish, railway laborer, a man of very strong constitution, left his home for Northern Dakota, where he went to work at harvesting. While there he was taken sick, coughing, spitting bloody sputa; he had high fever and great thirst, and was delirious at times. All the accommodation he had was a straw bed under a shed. When almost in extremis he was put on board of the train which took him home. His breath was so offensive that, to use his own expression, "he had the car all to himself." I saw him in September of 1884. On entering the house the characteristic odor of gangrene was readily recognized. I could examine him only after placing a towel soaked in a 5% solution of carbolic acid over his face. He was very weak and depressed; pulse was 126, temperature, 39.2°C. Physical examination revealed the following condition of his lungs: Right lung, complete dulness over lower third, respiratory murmur only heard over infra-clavicular region; absent over rest of lung. Left lung normal. I introduced an aspirating needle in the lower lobe of the left lung, and drew out a dirty greenish fluid, with the characteristic odor of gangrene. My prognosis was unfavorable, and mentioning the fact that a formidable operation might save him, the patient readily consented to submit to it, and after some preliminary arrangements the next morning, I made an incision over the seventh rib in the axillary line, excising 3 centimetres of the rib. I then inserted an exploring needle into the gangrenous cavity; and my Paquelin cautery failing to work, I made my way into the pulmonary cavity with a scalpel and a pair of Pean's forceps. There were adhesions between the costal and pulmonary pleuræ, and when a drainage tube had been inserted into the

cavity, which was 2 centimetres long, a cupful of grangrenous looking fluid flowed out. Then I introduced a rubber drainage tube and put a Lister dressing over the whole side. The patient rallied nicely, and his troublesome cough and expectoration and constant nausea ceased. At no time did his temperature go above  $38.5^{\circ}\text{C}.$ , except on the seventh day, when the drainage-tube slipped out, and the opening closed up; then he began to expectorate and complain of pain in the side, until the drainage-tube was re-inserted and the cavity washed out with a 3% solution of carbolic acid; this gave rise to a severe fit of coughing; and after this the cavity was only sponged out with a piece of gauze. The opening closed rapidly, and in six weeks the patient was discharged, and soon went to work as a trackman on the Northern Pacific Railroad, where he is now working in perfect health.

CASE II. *Abscess of Lung Following Gun-Shot Wound.*—*Pyopneumothorax.*—Jos. S., æt. 25 years, German, and a farmer, was always healthy up to the time of the accident, which occurred while unloading a shotgun, when the shell exploded and flew back, entering the right lung between the second and third rib. The shell was easily extracted, but as was afterward shown, pieces of his clothing were retained in the wound. Four weeks after the accident, I saw him in consultation with Dr. J. A. Dubois, of Sauk Center. I found the patient very much emaciated, suffering from dyspnœa, with high temperature and rapid pulse. Further examination revealed a wound between the 2d and 3d ribs, through which a greenish pus flowed; general dullness existed over the right lung; below the wound there was loss of respiratory murmur, and only a few rales could be heard below the 2d rib.

The diagnosis was pyothorax, and an Estlander operation was advised. The patient was brought here to my private hospital, and on December 2, 1884, the operation was performed by Dr. Dubois and myself. Pieces of the 3d, 4th, 5th, 6th and 7th ribs were extracted, varying in length from two centimetres to seven centimetres. While excising the 3d rib, an opening was made through the lung, through which pus, powder and shreds of clothing came out; the wound was dressed antiseptically. The patient was then in a satisfactory condition. Temperature had gone down from  $39.5^{\circ}\text{C}.$  before the operation, to  $37.5^{\circ}\text{C}.$  the next morning. The man made a good recovery and is now well. There remained a small fistulous opening for almost three months, but that soon healed up and left no lesion of the lung.

CASE III. *Pulmonary Abscess Following Measles.*—*Pneumotomy*—*Death.*—Alice G., æt. 17 years, American, was first seen with her physician, Dr. H. M. Post, on August 17, 1889. The patient had had

measles a month before, and had been losing flesh ever since, coughing and expectorating a good deal. On examination a cavity was detected in the middle lobe of the left lung. An operation was advised and performed the 20th of the same month; pieces of the 3d, 4th and 5th ribs of 4 centimetres were removed, and the abscess cavity opened with the cautery. The wound was packed with iodoform gauze,

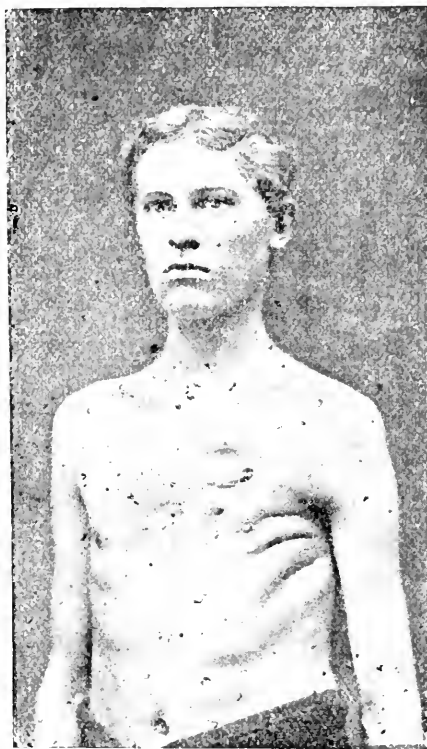


FIG. I, SOWING RESULT OBTAINED BY RESECTION OF RIBS AND PNEUMOTOMY IN CASE II.

and a dressing of the same material applied. There was a good deal of shock, but she rallied nicely. The suppurating process went on, and she died of septicæmia two months after. No autopsy was allowed. This was a case of multiple abscess. The patient was of tuberculous stock.

CASE IV. *Abscess of Lung Following Typhoid Fever—Pneumotomy—Recovery.*—George G., Irish, æt. 29 years. Operated Septem-

ber 27, 1888. This man having previously always been strong and healthy, contracted fever in the spring of 1888, and remained in bed for over two months. When he got up he complained of a pain in his side, and was generally troubled with coughing, which at first was slight. When I saw him he was expectorating daily large quantities of pus, and was very much emaciated. Physical examination revealed dulness over the lower lobe of the right lung, lessened respiratory murmur over the upper portion of lung. Left lung normal; temperature the night before the operation was 40°; had high chill and profuse diaphoresis.

My diagnosis was abscess of the lower lobe of the right lung.

I resected pieces of the 3d, 4th and 5th ribs in the axillary line, and an opening was made into the lung tissue with the thermo cautery, letting out a small quantity of pus.

The cavity was packed with iodoform gauze and the patient rallied nicely. The same evening temperature was 37.7°, and the next morning temperature was 37.2°; and at no time during his convalescence did it rise above 38.5°. The first dressing was changed on the second day; the second on the seventh day, and on October 12 the sinuses were closed, and the man discharged cured. He is now working on his farm, a well man.

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# A CONTRIBUTION TO THE STUDY OF FLAT FOOT.<sup>1</sup>

By VIRGIL P. GIBNEY, M.D.,

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I AM indebted to Dr. R. Abbe of this city for a suggestion which he carried out during the last winter and spring. He remarked to me one day, while passing through the hospital, that he had recently relieved two cases of painful flat-foot by operating for ingrowing nail on the same foot. Since presenting my paper at the Boston meeting, Dr. Abbe has kindly furnished me with the notes of the cases which led to his enthusiastic remark. With his permission, therefore, I take pleasure in adding them to my own.

Shortly after his conversation with me, it happened that, on May 12, a patient, a gentleman from San Francisco, æt. 27 years, who had come to me in the early part of the present year for painful flat-foot, (referred by my friend, Dr. Harry Sherman, of San Francisco), came into my office complaining of a failure during the spring to get the relief which we had both confidently expected. This gentleman had been suffering for 2 $\frac{1}{2}$  years with an annoying pain in the sole of his foot, which pain he thinks followed an attack of subacute rheumatism. I found on examination, January 30, a point of tenderness over the scaphoid near its junction with the first meta-tarsal. I had no difficulty in restoring the arch of the foot by manual force, and he felt some relief. He had worn, however, various kinds of steel springs, and had had massage employed, and various operations suggested, etc. I had his shoe built up after the plan

<sup>1</sup> Presented at the Annual Meeting of the American Orthopædic Association in Boston, September, 1889.

of Mr. Thomas, of Liverpool, and prescribed faradism for the posterior tibial group of muscles. This was well carried out, and he for a time got relief. He did not get entire relief, however, and I had him see Dr. Jacobi on April 2, with regard to the existence of any rheumatic element. Dr. Jacobi wrote me as follows:

"He has a periostitis of the lower face of his first (and second) meta-tarsal bones." He saw one or two distinguished surgeons in the city, one of whom suggested an exploratory operation on the bone. It so happened, then, that a few days after Dr. Abbe's suggestion, this gentleman came into my office. He came in one evening in great distress, complaining that his foot was no better and that an ingrowing nail on the same foot, great toe, was giving him much annoyance. I found the toe very much inflamed, and also learned that he had had this ingrowing nail for two or three years. The following are my notes:

May 14.—Under ether the offending portion of the nail was removed, the exuberant granulations were removed also, and the toe dressed antiseptically.

May 23.—Wound has about healed, pain is very much relieved, and he starts to-day for California.

Sept. 12.—A friend reports that she has recently heard from him, and he says he has not had an ache or pain since he left for San Francisco.

Dr. Abbe's cases are as follows:

CASE I.—One year ago, a lady was referred to me for relief of intractable plantar pain on one foot, that had resisted treatment at the hands of her physician. I thought the arch of her foot slightly depressed, and numerous plantar pressure diagrams showed the paper tracing broader than that of the opposite foot. My sole belief was for some weeks that she had beginning flat-foot and corresponding pain. I had her shoe built up after the suggestion of Bernard Roth, and carried out systematic massage after his principles—but without benefit.

One day I noticed her great toe-nail was buried deeply into the flesh, without, however, either inflammation or granulation.



I advised her to let me do Cotting's operation, which I universally resort to under cocaine for ingrowing nail. She consented, and had the pleasure of being relieved at once of her neuralgic foot, and of being able to walk half a mile at a time without pain, whereas before operation to walk half a square would give her the greatest plantar pain.

After three or four months some of her old pain came on again, and I found the cicatrix under the nail tender to pressure. This has since been entirely relieved, and she has proven her recovery by long and painless tramps during the past summer.

CASE II.—During the last winter a heavily built German woman was sent to me with pronounced flat-foot of several years' development, but with plantar pain of a few months' duration. I at once noticed a well developed case of ingrowing toe-nail, and she consented to Cotting's operation. She lived away from the city, and I was only able to keep her under my eye for a week. During that time, however, I let her walk about her house, and she was entirely free from the plantar pain. I am unable to report of her case since then.

# THE TREATMENT OF FRACTURES OF THE CLAVICLE.<sup>1</sup>

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THE many forms of bandages and apparatus which have been devised for the treatment of fractured clavicle simply bear witness to the fact that our means of treating this troublesome accident are not as yet perfect, and anything that will tend to elucidate the subject and thus lead to better results is worthy of consideration. Some time ago, having had a case of posterior dislocation of the acromial end of the clavicle, I was impressed with the advantages of not only effecting a reduction in the recumbent position, but of applying the retaining dressing at the same time. The success which followed the procedure in that case (reported in the *ANNALS OF SURGERY*, May, 1887), induced me to apply the same method to fractures of the clavicle. The ease with which most of the deformity which is present in fracture of this bone disappears when the patient lies flat on his back, is well known. The object aimed at was to apply a dressing that would retain the parts in as near the position which they occupied when the patient was on his back as possible. To effect this a plaster-of-Paris dressing was used. The procedure at first adopted was to make the patient lie flat on his back and place into the hollow above the clavicle, above and to the inner side of the seat of the fracture, a small hard roll of patent lint. This was kept in place by a couple of adhesive straps crossed over the

<sup>1</sup>Read before the College of Physicians of Philadelphia, November 6, 1889.

shoulder. The whole shoulder was then covered with a double layer of lint, over which several layers of gauze, well impregnated with plaster-of-Paris cream, were placed. A pad was next placed in the axilla, and the whole firmly bandaged with a Desault bandage. The patient was kept on his back until the plaster had firmly set.

My object in this dressing was to make a mold for the affected shoulder in which the clavicle laid in a groove supported in its entire length.

The plaster having hardened while the patient was in a recumbent position, a mold was formed of the parts while the fracture was in the best possible position, and it retained this form even when the patient was allowed to rise.

For a short time after the application of the dressing things went on well, but I soon found that the muslin bandages used failed to insure sufficient immobility of the parts, and consequently, the shoulder dropped, and the common angular deformity showed itself. When, after several trials, I found this to be the case, I modified the dressing by adding plaster-of-Paris bandages to the muslin ones, and the results immediately improved. The dressing eventually adopted was applied as follows: The patient being placed on his back on a hard level surface, with no pillow for the head, as good a reduction of the deformity as possible was made. A small hard roll of lint was then placed above the outer extremity of the inner fragment immediately above the seat of fracture, but not pressing on the pointed extremities of the bone. A pad large enough to keep the arm well away from the side, but not hard enough nor of sufficient size to act as a fulcrum and pry the shoulder outward, was placed in the axilla. The shoulder, elbow and opposite healthy axilla were then carefully covered with a layer of cotton. The patient being partially raised by an assistant, the arm of the affected side was bound to the body with a muslin bandage, the turns beginning above and descending to the elbow. With another bandage the third roller of Desault was applied, the initial extremity being placed in the sound axilla and the roller carried across the back, over the affected shoulder, down in front of the arm, beneath the elbow, and back to the healthy axilla. Crossing at this point

the initial extremity, the roller was carried across the front of the chest over the affected shoulder, down behind the arm beneath the elbow, and back to the healthy axilla. These anterior and posterior turns were then repeated with a plaster bandage, and the dressing finished by a series of circular turns around the body. The hand was placed in a sling hanging from the neck, and the patient kept quiet on his back until the plaster had hardened. He was instructed to return at once if the dressing was uncomfortable, but otherwise to present himself in a week. On his return the dressing was examined, and if the plaster bandage with its edges had irritated any part, additional cotton was tucked in between it and the body. He was then dismissed for another week. On his return, the bandage having been on continuously for two weeks, it will be desirable to inspect the parts and renew the cotton beneath. With a saw and scissors the plaster bandage is opened on the side beneath the healthy axilla and the whole dressing removed, the patient being on his back. The surface is then cleansed with soap liniment and any irritated parts dusted with powdered oxide of zinc or covered with zinc ointment spread on lint, the small pad over the clavicle is inspected and clean cotton reapplied. The original plaster dressing is then replaced, and, while being held shut by an assistant is confined by turns of a plaster bandage passed circularly around the body. This second dressing may be allowed to remain on an additional two weeks, after which a handkerchief dressing, such as that of Mayor or Gosselin, may be used if desired. If, at the end of the first two weeks, the plaster dressing is much broken, it may be desirable to apply a new one.

This dressing is not intended as a universal bandage for all fractures of the clavicle, but rather for those obstinate cases which occur in youths sometimes, and usually in adults, in which the fracture is complete and the tendency to angular deformity from dropping of the shoulder marked. Its object is to raise and keep the lowered external fragment up to and level with the internal one, and it does this better than any other dressing I have tried. One is led to believe, from the good results claimed by confining the patient to bed, that in order to reduce the deformity completely, it is only necessary

to place the patient flat on his back. This may be the experience of some, but it certainly is not mine. Time and time again have I placed patients in the recumbent position and attempted a complete removal of the deformity, but it is comparatively rarely that I have been successful. The angular deformity can sometimes by this means be completely or almost completely reduced, but if the fracture is a bad one, there will almost always be, in spite of anything that can be done, a slight overlapping of the fragments. The point of the shoulder is kept out and away from the body by the clavicle, and when this is broken the muscles connecting the upper extremity with the trunk and the tissues which surround and are attached to the clavicle, particularly the subclavius muscle, all tend to draw the outer fragment inward, and I have yet to discover some means of obviating this. The attempt of Desault to do this by placing a pad in the axilla and prying the shoulder out is almost universally regarded as failing to accomplish the object, and for that reason in my dressing it is not attempted, but a pad of such a size is used as will, first of all, prevent the arm and chest from coming into contact and thus becoming irritated; and, secondly, as will prevent the arm from being drawn still further inward than it is when the patient is flat on his back.

The pad over the inner fragment must be nicely adapted and not too large. It should be large enough to a little more than fill the normal hollow which exists at this point.

The cotton should be spread over every part that is liable to become irritated by friction of the bandage, so that, usually, I envelop the chest in a thin broad layer in front and behind, with a thicker layer beneath the healthy axilla and the elbow and forearm of the affected side. This must be so carefully applied that the surgeon will feel perfectly secure in leaving the dressing on two weeks without the expectation of finding any serious excoriations on its removal. If so desired, a pad of cotton may be placed on the sound shoulder, and a few additional turns made over it and beneath the elbow of the affected side.

I have been trying this mode of treatment for the past two years, and as I see about twenty cases of fractured clavicles a year, have had a fair opportunity of testing it. The conclusion

I have come to in regard to it is that in those marked cases with a tendency to angular deformity, I can obtain better results with it than with other dressings.

I do not intend to claim that by its means many cases can be cured without deformity, but to present it as an affective means of obviating the tendency to angular deformity. In only one of my adult cases would I be willing to state that it got well without any deformity. In this patient the angular deformity was marked, but the fracture being more transverse than usual, there was little or no overlapping. In another case, that of a thin angular young man with an oblique fracture of the middle of the bone, consolidation took place without any angular deformity whatever, but on the back of the bone a small sharp angle showed where there had been some overlapping of the fragments. This case was a crucial test of the method because, on account of the thinness of the subject any deformity could at once be detected, and the fracture was one of the worst kind, being complete with overlapping and very marked deformity. In neither this nor many other of my cases, when the fracture was a marked one and oblique, could I by any device reduce the deformity absolutely—there would be small projections, either on the front or back of the bone which showed that overlapping still persisted.

In my last case, a young girl, treated by this method, the last part of the treatment was conducted by Dr. Henry Deaver, and he informed me that she recovered without any angular deformity whatever, but that there was some shortening of the injured bone as compared with the opposite one. This was undoubtedly due to overlapping, proof positive of a complete fracture.

In cases of children and others in which from the situation or character of the injury, the tendency to angular deformity is not marked, of course other methods of treatment will yield satisfactory results. The use of plaster-of-Paris dressings in the treatment of these cases is not presented as anything new but it is the principle of effecting as complete reduction as possible while the patient is on his back, and the application of the dressing while in this position, that is submitted for consideration.

## NEW METHOD OF OPERATING FOR RELIEF OF DEFORMITY FROM PROMINENT EARS.<sup>1</sup>

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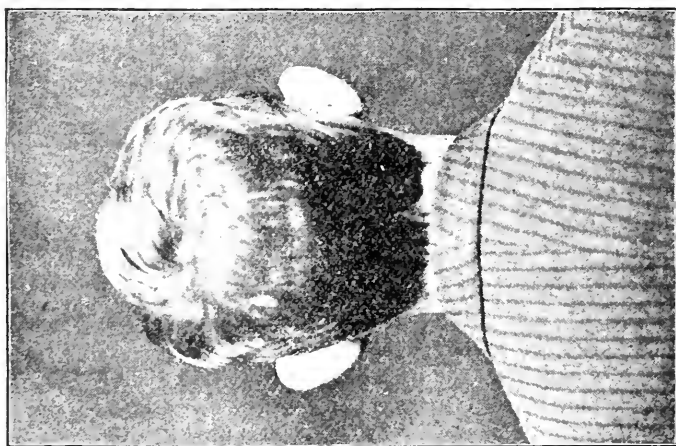
PATIENT, æt. 19 years, was kindly sent to me by Drs. Girvin and Musser in February, 1889. Fig. 1, from a photograph, shows clearly the deformity. For obvious reasons it was taken from behind so as not to show his face. A front view would show the auricles even more conspicuously.

The operation that I decided upon for relief was done as follows; As shown in Fig. 2, the oval dotted line represents the portion of the skin that was removed from the posterior surface of the auricle, the cartilage being laid bare by its dissection. In the long axis of the oval excision of the skin a long, narrow piece was removed from the cartilage itself, V-shaped on cross section like the furrow of a plough. Great care was taken not to cut through the skin on the anterior surface of the ear. On the left side 3 catgut stitches were introduced in the cartilage itself in addition to those in the skin. On the right side reliance was placed entirely on the sutures of the skin. The result was equally satisfactory on the two sides. The two operations were done at the same time. They were attended with very free bleeding, which, however, was easily controlled. The wound was dressed antiseptically, of course. The patient was out of bed the next day. He was not at all sick from the operation. The stitches were purposely not removed until the tenth day. The result is shown in Fig. 3.

REMARKS.—When I decided to operate I was not aware that any one had preceded me in the matter, but I have since found in the *Archives of Otology*, New York, 1881, vol. x., p. 97, a

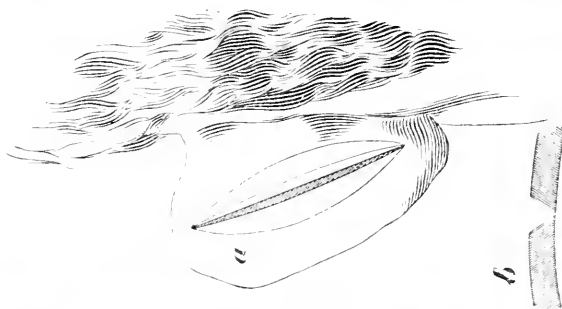
<sup>1</sup>Read before the Philadelphia County Medical Society, September 11, 1889.

FIG. I.



NATURAL PROMINENCE OF BOTH EARS BEFORE OPERATION.

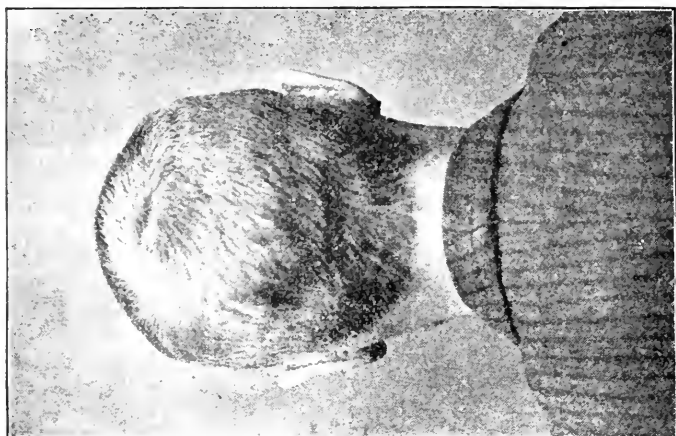
FIG. II.



*a.* FULL PROMINENCE OF ONE EAR AND  
THE EXCISION OF SKIN AND  
CARTILAGE.

[THE PORTION OF SKIN EXCISED SHOULD  
BE BOTH WIDER AND LONGER.]  
*b.* TRANSVERSE SECT ON OF CARTILAGE  
TO SHOW THE PIECE CUT OUT.

FIG. III.



THE RESULT.



description of a case by the late Dr. E. T. Ely, in which he successfully remedied a similar deformity. I would, however, decidedly give the preference to the method which I adopted, for this reason: Ely removed an oval piece comprising nearly the entire length of the auricle and through its entire thickness, thus including the skin on its anterior surface. This, of course, involved a scar which would always be visible from in front. The plan which I advise produces no scar in front, as the skin is left intact. I believe it to be always needful, however, to remove a wedge-shaped piece from the cartilage itself, as well as a generous oval piece from the skin. If the skin alone is removed, the natural elasticity of the cartilage would stretch the skin in time and probably reproduce the deformity.

The result in this case was perfectly satisfactory, the only scar being the linear one on the back of each auricle, which was only visible by standing back of him and looking carefully for it.

## EDITORIAL ARTICLES.

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### RECENT BRITISH CONTRIBUTIONS TO THE SURGERY OF RENAL CALCULI.

The discussion on Renal Surgery at the Leeds meeting of the British Medical Association, in August last, was especially fruitful in bringing out experience in the line of dealing with calculi of the kidney. It is only twenty years since Mr. Thomas Smith read his paper before the Royal Medico-Chirurgical Society of London, in which he proposed, on theoretical grounds, the operation of reaching the kidney from the loin, and incising it for removal of calculi within its cavity. No department of surgical effort illustrates more strikingly the character of the newer surgery of to-day than does this. From the report of the discussion given by the *British Medical Journal*, the following digest is taken :

MR. HENRY MORRIS, of London, remarked that calculi are imbedded in the kidney in various fashions, and as a consequence, and quite apart from the size of the stones, some are much more difficult to discover than others. In some cases, aspiration or simple incision and drainage are insufficient and nothing less than a digital examination of the interior of the pelvis, of the calyces, and of the commencement of the ureter must be resorted to. A misimpression may be caused during an exploration of the kidney by a deposit of tubercle, or by a small abscess, just beneath the renal surface, which, from its hardness and outline, gives the same tactile sensation as a calculus.

After exposing a kidney of this kind the surface is seen more or less mottled, puckered, and uneven, and, on passing the finger over it, a hard circumscribed spot is felt. On scraping through the kidney this hard spot vanishes as the finger-nail reaches it, and, if the wound at the time is free of blood, a little cheesy matter or a drop or two of pus

is seen escaping from it. Or what may happen is this: the hard spot, after being felt and pressed upon two or three times, softens, and then becomes flaccid, and on puncturing it a little pus or cheesy matter escapes. When only one such spot of the size of a pea or horsebean is felt, the sensation strongly suggests a calculus; but when the deposits are multiple mistakes are not so likely to arise, though groups of tubercles of miliary size give the sensation of particles of sand adherent to the capsule.

Clinically, one of the most important signs of calculus, as distinct from the early stages of tubercular disease, is the tenderness on pressure over the kidneys so frequently felt in calculous disease.

Various diseases of the prostate—tubercle, abscess, and stone, certainly—may give rise to symptoms which simulate renal calculus.

Considering the nervous associations between the several parts of the genito-urinary system; and remembering how frequent and painful micturition sometimes is in renal affections, and in what various and distant parts the pain of renal calculus is sometimes felt, there is nothing surprising in the converse condition—namely, pain transferred to the renal region from disease in the lower urinary tract. If, in addition to this pain, there is a small amount of pus or pus and blood in the urine without the symptoms of cystitis, it is easy to understand how doctor as well as patient may associate the seat of the pain with the other symptom. In some cases, it is probable tubercular disease begins simultaneously in the kidney and prostate.

MR. BENNETT MAY, of Birmingham, from an experience of 15 cases in which he had operated for stone in the kidney, emphasized the difficulties sometimes experienced in detecting the stone after the kidney was exposed. In fully half of his cases the stone was fixed in the parenchyma of the kidney. These stones are mostly of slow growth, of oxalate of lime, circular or pyramidal in shape, not branched, and occur in young males. The kidney itself remains apparently healthy, even in a late stage of the disease. The prominent symptom in these cases is the pain; the main diagnostic test is pain on deep local pressure over a small area below the last rib. There may be small microscopic traces of blood or blood in considerable amount after exercise;

but pus is commonly absent or present only in small amount.

These stones are difficult to find, but give the most perfect results if removed. Several of these patients had a narrow escape of leaving the table with their stones undiscovered. In exploring the kidney he prefers to enter the needle and the knife at the outer border, and carry it inward, radiating to the hilus, as it much more thoroughly sweeps the tissue in this way than if entered from behind, and there is less chance of wounding the large vessels. He always cuts into the kidney and explores it with finger and sound, if acupuncture fails.

Stones in the pelvis of the kidney commonly grow much more quickly and to a larger size. Pus appears early and is a prominent feature, and the kidney soon undergoes structural changes, ending in pyonephrosis. These stones are usually easy to find, but recovery is apt to be imperfect.

DR. DAVID NEWMAN, of Glasgow, contrasted the results of nephrolithotomies with and without suppuration of the kidney. In the former, of 60 cases, 34 recovered and 26 died, giving a mortality of 43.3 per cent; whereas, in 42 cases without suppuration of the kidney there was not a single death. This indicates very clearly the importance of making an early diagnosis; and any information which we can collect to aid us in detecting renal disease in its early stages must necessarily improve our statistics. Catheterization of the ureters, and the estimation of the quantity of albumen and the amount of hæmoglobin in the urine may aid one in determining the seat of the hæmorrhage, and in ascertaining whether or not the disease is limited to one kidney. Urine containing blood is always albuminous, but the relative proportion existing between the red corpuscles and the serum depends whether or not the hæmorrhage is associated with inflammation. If the ratio of albumen to hæmoglobin is as 1 to 1.6, then it may be concluded that the appearance of albumen is entirely due to the presence of blood; but if the quantity of albumen is much increased beyond the proportion just mentioned, the indication is in favor not only of an independent albuminuria, but also points to a renal affection as the cause of the hæmaturia.

MR LAWSON TAIT, of Birmingham, reported fourteen operations

for kidney calculus, all of which were completely and permanently cured. From his experience in these cases, together with many other cases in which he had operated upon kidneys, he advised that all tumors of the kidney, all suppurating kidneys, and all kidneys with persistent, incurable and unbearable pain in them should be exposed by incision, laid open, and thoroughly explored by the finger tip. Stones may then be removed, abscesses drained, and hydatid or cystic growths removed with trifling risk. Removal of the organ will rarely be required save in the case of sarcomatous growths.

MR. KENDAL FRANKS, of Dublin, called attention to a class of cases which were not uncommon, namely, those in which the diagnosis of renal calculus was almost certain, and in which the symptoms clearly indicated the affected side, and yet in which, when the kidney was exposed, the most careful digital manipulation and the most systematic exploration with a long needle failed to detect the presence of a stone. Now, in such cases the practice had most frequently been to take one of two courses. The first course—and perhaps that most usually adopted—was to close up the wound and to trust to relief being afforded by the division of the nerves which necessarily resulted from exploratory incision. Such temporary relief often followed, but it was very rare to find it lasting, and he ventured to look upon such a proceeding as surgically unsound. The second course which had been adopted was to excise the offending organ, as had been done by Mr. Henry Morris. But this was too severe a remedy, and one which Mr. Morris himself condemned, suggesting that it might be wiser to incise the kidney *in situ* and to search for the stone systematically. This was a proceeding Mr. Franks had himself adopted with marked success. He did not consider that incision into the kidney substance was a formidable proceeding, and as an exploratory measure was much to be preferred to excision. Should the stone be found, it was better to find it in a kidney which, otherwise healthy, still formed part of the patient's body, than in a kidney on the dissecting table. In the case he alluded to the symptoms of the stone were tenderness on pressure over the right kidney, with intense paroxysmal pain, beginning in the right renal region and shooting down the right side into the hip and groin. There

was a well-marked deposit of oxalates in the urine but no blood or pus. When the kidney was exposed, no stone could be felt anywhere, and a needle passed systematically through the renal substance failed to detect it. Mr. Franks then incised the kidney for a length of about two inches from the convex border right through the pelvis, and, after some careful search, reached a small abscess cavity containing a small stone and some crystalline particles. The incision in the kidney had to be enlarged to the extent of three inches in order to clear out the cavity thoroughly. The patient made a complete recovery, and had not since been troubled with any of her former symptoms.

Mr. Franks also laid stress upon the importance of leaving the wound in the kidney to granulate without using any means to close it. A case he mentioned showed the aggravated symptoms of renal colic which might be caused by a foreign body, such as a gauze plug inserted into the renal wound. He also thought that by leaving it gaping all blood-clots and *debris* would be gradually washed out, and thus the danger of their forming later the nuclei of stones would be avoided.

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#### CZERNY'S EXPERIENCE WITH RESECTION OF THE STOMACH AND INTESTINES.

In a paper<sup>1</sup> read before the surgical section of the Society of German Scientists and Physicians, Prof. Czerny gave the results of resections of the stomach and intestines and of the gastro enterostomies performed at his clinic. These results did not include the operations performed for gangrene or acute perforation of the gut. He performed eight pylorectomies for cancer in seven persons, one patient being operated on a second time for a recurrence 11 months after the first operation; this patient died of gangrene of the colon, as did two of his other cases. Two elliptical excisions, one for stenosis of pylorus following ulcer, the other for sarcoma resulted successfully.

Of 3 pylorectomies for non-malignant stenosis 1 terminated fatally owing to separation of the sutures, the other 2 recovered.

<sup>1</sup>Deutsche Med. Wochenschrift, 1889, No. 45.

Thus in 13 resections of the stomach performed on 12 patients, 4 died and 8 recovered.

Permanent cure resulted only in cases of non-malignant stenosis, while in those of malignant origin, though improvement was considerable, death ensued in from 5 months to 2 years.

Czerny made 16 exploratory laparotomies, 13 times for cancer and once for suspected extensive adhesions of the stomach, and only 1 case resulted fatally.

According to Czerny, gastro-enterostomy is indicated in cases which are not suitable for resection, but gives the patient such relief that some of them consider themselves cured. The author performed the operation 5 times after Wolfler's method, and 6 times after v. Hacker's. He regards the latter as anatomically the more correct, but it can only be successfully performed when the stomach is much dilated, and so movable that it can readily be dragged out through the abdominal wound. He usually makes a 3 cm. long opening in the stomach and intestine and employs about 30 sutures, but says that it is much better to make the opening 4 to 5 cm. long, as there is a great deal of subsequent contraction. The author has not used Senn's plates, and can not yet decide on the value of the method.

The results in Czerny's gastro-enterostomies were not as good as in resection of the stomach, as only 4 cases were benefited by the operation. One case died 2 weeks after its discharge from the hospital in consequence of some error of diet. Two lived respectively,  $5\frac{1}{2}$  and  $11\frac{1}{2}$  months and 1 was in good health  $2\frac{1}{2}$  months after the operation and has not been heard of since.

In 3 cases death was due to sepsis following the operation and 4 cases died either from progressive marasmus or pneumonia in 2 to 4 weeks.

Czerny resected the intestine 6 times for tumors, with a result of 4 deaths and 2 recoveries. In 3 cases the tumor which originated in the colon was so firmly adherent to the small intestine that resection of a portion of the latter was required. The primary was situated 3 times in the transverse colon and 3 times in the cæcum. Of the cases of recovery after the operation, one is still living and the other died  $4\frac{1}{2}$  months later from a recurrence of the disease.

Especially interesting are 5 cases of resection of the intestine for tuberculous ulcers. In 3 cases the ileo-cæcal portion of the gut was resected on account of symptoms of stenosis, and of these 2 recovered, and one died from necrosis of the sutured portion. In the two other cases the small intestine was affected and had resulted in intestinal fistulæ, for the relief of which the operation was performed. One case recovered, the other on whom 7 openings in the gut had to be closed, died from perforation occurring at a distance from the suture.

In 4 cases resection of the intestine was done for intussusception (3 ileo colic and 1 colic), with death due to collapse.

On account of fæcal fistulæ following hernia Czerny operated 6 times. As a rule the fistulæ was surrounded by an elliptical incision which was prolonged on both sides, and the intestine freed from its surroundings. In 2 cases a fastening of the edges of the wound and its closure by the "étage" suture sufficed. In the other cases circular enterorrhaphy had to be done.

In 5 cases the fistula was situated in the small intestine and in 1 case in the transverse colon, which was successfully resected.

Of these 6 cases, only 1 died, the others recovered perfectly. The author therefore lost 8 patients in 21 resections. In 4 cases a double resection was necessary and the result was 2 deaths and 2 recoveries, and in one of the fatal cases 6 fistulæ had to be closed.

In the hands of experienced surgeons the results of resections will improve as is proved by the author who, previous to 1885 had had 4 deaths in 7 resections, and since then only 4 deaths in 14 operations.

Most frequently death was due to collapse, less frequently to septic peritonitis. In only one case was the suture insufficient and necrosis occurred.

Healing of the intestinal wound always took place by first intention.

Drainage of the abdominal cavity was not resorted to. A double row of interrupted sutures was used.

F. C. HUSON.



KRNOELEIN ON THE PATHOLOGY AND OPERATIVE TREATMENT  
OF DERMOID CYSTS OF THE ORBITS.

Prof. R. N. Krönlein, of Zurich, in the first part of the fourth volume, 1888, of Bruns' "Beiträge für klinische Chirurgie," discusses at length dermoid cysts of the orbits.

From the rarity of such tumors, and the fact that the few cases are further divided between surgeons and ophthalmologists, no full account of them has been given, though Berlin (1880), Heineke (1882) and Trendelenburg (1886) have some mention of them. Their complete removal is difficult but important for the sake of the eye and to avoid remaining fistulæ.

I. Hour-Glass Dermoid of the Orbita.—By this is meant a dermoid cyst with one portion deep in the orbit (saccus orbitalis), the other in the temporal fossa (saccus temporalis), connected through a defect in the external orbital wall. This formation of the cyst is similar to and produces the same characteristic type of trouble as that of the so-called hour-glass hygroma of the vola manus, or that of the bilocular hydrocele, or Krönlein's inguino-properitoneal hernia.

As a paradigm, he gives the case of a farmer, æt. 21 years, who sought relief from a swelling in the left temporal region. This was said to have developed spontaneously, without pain, some four weeks previously. Still it turned out that a certain irregularity of the eyes had been noticed since childhood.

Protrusion of bulbus down and inward; prominence of outer upper portion of orbit, and still more of the temple behind external orbital border and zygomatic process. Tension of the temporal skin drew the eyebrow somewhat up and outward, in which direction only were the eye-movements impaired. Vision, left= $\frac{1}{3}$ , without narrowing of field. Diplopia only from use of prisms. Papilla and fundus normal, except veins on left somewhat fuller. (Ophthalmic data from Prof. O. Haab.)

Most striking was the result of palpation. Pressure with the finger

on the temporal swelling caused the upper orbital region to become noticeably prominent and the eye to protrude more than before. A finger at the same time on the upper lid felt a sensation like deep fluctuation. The reverse experiment was just as definite. No pulsation nor vascular sounds. Head otherwise normal, even naso-pharynx. No cerebral or trigeminal symptoms, impediment to mastication, nor break in the external orbital wall.

The differential diagnosis, only partially decided in advance, lay between (1) tumor retromaxillaris of von Langenbeck, (2) pulsating exophthalmos, (3) speno-maxillary cephalocele (Heineke), (4) dermoid cyst, cavernous angioma, lymph angioma, lipoma, (5) sarcoma. However, intervention was demanded (eye, brain, etc., in danger from delay). He decided to extirpate from the temporal side after opening the field freely—half-moon incision through skin fascia and muscle, from zygomatic process of frontal back along zygomatic arch to about 3 ctm. before the ear. Tumor adherent to periosteum; behind the speno-frontal process it extends through a circular opening, 2 ctm. in diameter in the outer wall of the orbit. The borders of the opening are smooth and covered with periosteum. To reach the orbital portion of the tumor it was necessary to chisel off 5 ctm. of the over-projecting speno palatal process of the zygomatic bone. Suture of muscle, then of skin. Patient discharged in three weeks. No diplopia, no protrusion of eye, no difference in retinal vessels, vision improved.

Dermoid tumors deep in the side of the orbita, or again in the temple, are known, but this is believed to be the first reported case where two such were in communication.

The bone defect, where a suture normally occurs, he indicates must have been congenital; hence he extends Trendelenburg's theory of the origin of orbital dermoids from the foetal eye-nose furrow, to include the temporal ones also.

II. The Osteoplastic Resection of the External Orbital Wall Provisional to the Extirpation of Deep-Lying Lateral Orbital Tumors, Especially Orbital Dermoids.—The removal of such cysts has proven very difficult and uncertain when they are deep, retrobulbar and thin-walled. The whole operation cannot be controlled by the eye, and

when fragments are left, persistent fistulæ are apt to form and in time damage the visual organ. Hence Krönlein devised the following operation for such a case:

1. Skin incision. This begins in the temple, where the linea semicircularis of the frontal bone is clearly felt through the skin, about 1 cm. above supraorbital margin—and runs down in an anteriorly slightly convex curve along the external orbital border to the level of the upper zygomatic border, where it bends backward and ends at the middle of the zygomatic arch. This incision goes down along the external orbital edge through the periosteum. From this periosteal cut the entire periorbita is very easily lifted from the lateral orbital wall by the elevator. The tip of the elevator is then passed obliquely downward into the inferior orbital fissure to fix the point toward which the following bone-cuts converge.

2. Bone incisions. The osteoplastic resection extends to the entire outer orbital border (process zygomaticus oss. front. et processus frontalis oss. zygomatic) and that part of the outer orbital wall which lies between this border and the inferior orbital fissure (pars orbitalis oss. zygomatic and anterior part of the ala temporalis oss. sphenoid). Hence the piece of bone to be temporarily removed has the form of a wedge, the base of which is formed by the anterior orbital border (vide supra), and the tip of which ends in the anterior division of the inferior orbital fissure. The bone is best divided with a sharp chisel without further preparation, and especially without endangering the natural attachments of the temporal fascia and the fibres of the temporal muscle on its temporal side, since to these attachments, together with the skin, the nutrition of the separated piece of bone for a time falls. First, the zygomatic process of the frontal bone is chiselled straight through, somewhat above the easily visible and palpable sutura zygomatico-frontalis, and the bony division continued in a direct line obliquely through the lateral orbital wall toward the elevator placed in the inferior orbital fissure. Then follows the horizontal chiselling, through the frontal process of the zygomatic bone, close to its base, likewise continued into the fissure. Thereupon, the mobilized piece of bone with the

skin fascia muscle flap of the temporal region can be thrown back sufficiently to allow free entrance to the lateral part of the orbit. This operation is extremely simple and rapidly executed. After extirpation of the orbital tumor the combined flap is again brought into place and secured by sutures. Cure without disfigurement.

His illustrative case is a re-operation for an orbital dermoid that had left a fistula. Two plates and a wood-cut help to make the article clear.

## INDEX OF SURGICAL PROGRESS.

### GENITO-URINARY ORGANS.

**I. Thirty-Six Suprapubic Lithotomies.** By DR. THEODOR S. ROSENBAUM (TIFLIS). The author describes 56 suprapubic lithotomies performed in the Mikhailovsky Hospital, partly by himself, partly by Dr. M. K. Golbeck and other house surgeons, during 1883-88. Of the 36 cases, 17 referred to Georgians, 7 to Armenians, 5 to Hebrews, 3 to Russians, 3 to Tartars and 1 to Ossete. Of the number, 29 recovered, 7 (19.44%) died in from 1 to 16 days after the operation, the high mortality being attributed to the series including a relatively large proportion of cases complicated by grave prostration, severe cystitis, pyelonephritis or other renal lesions. Eleven patients were aged from 2 to 5 (all recovered); 11 from 5 to 10 (2 died); 6 from 10 to 15 (2 died); 4 from 15 to 25 (all recovered); 4 from 25 to 40 (3 died). In 25 cases the duration of the disease varied between 2 months and 4 years (2 or 9.5% died); in 15 between 5 and 10 years (5, or 33.5% died). In 20 patients, their general nutrition was good, and the bladder sound (only 1 of them died, and that from peritonitis caused by an accidental injury to the peritoneum); 3 were well nourished, but had slight vesical catarrh (all recovered); 6 were of middling nutrition and intense cystitis (1 died); the remaining 7 suffered with severe prostration and intense catarrh of the bladder (5 died). The stone weight varied in 19 from 6.3 to 10 grammes (all recovered); in 27 from 11 to 80 grammes (7 died). An average stay in the hospital (in cases of recovery) was 34 days, the maximal 65, the minimal 14. As a rule, the urine commenced to flow through the urethra in a fortnight; in 4 cases on the third or fifth day. The essential details of the operations were these. The patient being placed on his back with elevated pelvis, the abdominal integuments were thoroughly

disinfected, and the bladder filled up with fluid through a metallic catheter (with an elastic tube attached to its end) by means of a syringe. The procedure over, the filled bladder was lifted up (except 3 cases where a colpeurynter was used) by means of 2 fingers introduced into the rectum and exercising a steady pressure on the vesical neck and fundus. The bladder was reached through a funnel-like wound, measuring from 4 to 8 cm. superficially, but gradually shortening in deeper layers, the vesical incision oscilated between 3 and 4 cm. After the extraction of calculi, the bladder was washed out with a  $\frac{1}{3}\%$  solution of salicylic acid, the wound powdered with iodoform and plugged with iodoform gauze or, in cases of cystitis, supplied with a short drainage tube surrounded by the gauze and introduced either in the vesical cavity or only in the cavum Retzii. The drainage was usually removed on a second or third day, but kept somewhat longer in the presence of severe catarrh. In such cases the viscus was daily washed out with a tepid  $\frac{1}{3}\%$  salicylic solution. The patient was always kept on his back. [Only 4 cases of the series are included in Dr. Solonika's collection of Russian high sections. (*Vide* ANNALS OF SURGERY.—*Reporter*) *Kavkazsky Meditzinsky Sbornik*, 1889, Vol. 49.

VALERIUS IDELSON (Berne).

**II. The Question of Catheterization in the After-Treatment of Suprapubic Cystotomy.** By H. LINDAUER. Lindauer considers the introduction of a permanent catheter, as well as frequent catheterization following suturing of the bladder in suprapubic cystotomy, the occasion of frequent mishap, in spite of the employment of the strictest antisepsis. Basing his practice on this opinion, he omitted this portion of the procedure in four cases; a single catheterization was done in one of these cases. The three other patients urinated spontaneously. Union by first intention occurred in the first three cases. In the fourth case Lindauer was compelled to resort to secondary suture, consequent upon a giving way of the sutures. This latter is attributed to violent coughing efforts on the part of the patient. Complete closure of the opening into the bladder thereupon followed. He suggested that it would seem to be particularly desirable to omit

the use of the permanent catheter in old individuals reduced by severe and prolonged cystitis and the presence of putrid decomposing urine. [It is questionable if retention of a catheter does less harm in these cases than the presence of the decomposed muco-pus and urine. The method of allowing the bladder incision or suprapubic wound to remain open and to close spontaneously, as well as the employment of the cross-incision of Trendelenburg, is to be considered in this connection.]—*Deutsche Med. Wochenschrift*, No. 34, 1888.

**III. The Etiology and Treatment of Nocturnal Enuresis in Children.** By DR. OBERLANDER. Nocturnal enuresis in children, like some pathological disturbances in adults, are, as a rule, unaccompanied by organic changes, and are to be considered the result of reflex irritation of the urethra or its points of opening. To suggest that the disease is pure enuresis seems insufficient. In proof of this it need only be pointed out that decided success in the cure of enuresis follows the treatment by circumcision, separation of preputial adhesions, and by dilatation or incision of a narrow meatus urinarius. Similar coarctations may occur at other points of the urethra which, as that at the meatus, may disappear during the development of the organs. The treatment recommended by Oberlander, in those cases in which no other cause can be discovered, consists in dilatation of the posterior portion of the urethra. Three examples of this method of treatment are reported.—*Berliner Klin. Wochenschrift*. Nos. 30 and 31.

G. R. FOWLER (Brooklyn).

## SYPHILIS.

**I. Muscle Syphiloma.** By A. BILE, (Kiel). These were first described by Bouisson (*Gaz. Med.*, 1846). Being readily mistaken for malignant growths, their real occurrence is inversely proportional to their surgical importance. The paper describes a series of cases from the practice of Esmarch, to which are added some from other sources. They are brought under three heads. 1. Of the sterno-mastoid; 4 new and 4 old cases. 2. Of the extremities, 6 new and 4 old. 3. Of

the trunk, 2 new and 4 old. Of those classed as new, 2 had previously been published (Wasmer, *Dissertation*, 1872).

These cases presented a great variety of characteristics clinically and histologically, like syphilitic affections in general. Microscopically they are even less definitely determinable than gummas elsewhere. They are usually hard—except some surrounding œdema in many fresh cases—and peculiarly pale. In half the cases the neoplasm is situated near the tendinous or bony attachment, in the four of the sterno-mastoid, at its clavicular end. Local irritation (strain, rubbing, etc.,) may act as immediate cause. Though considered tertiary several have been observed within a year from time of infection (18 weeks in Newman's case). They may develop rapidly, in 2 or 3 months, or less, or very slowly, 3 to 6 years. The more rapid their growth and the earlier after infection, the more quickly and completely they disappear, but the less hard their outline and conversely. In most cases muscle-regeneration obscures all visible scarring, though atrophy of the whole muscle has been observed. Local pain is a frequent but not constant symptom either in the rapid or in the slow; in one it was increased by motion and in several at night.

For making the difficult differential diagnosis—besides seeking other marks of syphilis—he offers the following helps:

1. As a rule, muscle-syphiloma are quite hard.
2. Tumors of the sterno cleido are most probably syphilitic.
3. Nocturnal pain is suspicious.
4. Remember the advice of Nelaton and others to first treat anti-syphilitically muscle-tumors, unless their non specific nature is positively established.
5. To avoid gross errors, yet lose no time, make an exploratory incision, to determine the somewhat characteristic appearance, then exploratory excision for microscopical examination though this latter may be inconclusive.

6. Do not despair though at first the anti syphilitic cure fails.—*Mittheilungen a. d. chirurg. Klinik zu Kiel* iv, 1888.

WILLIAM BROWNING (Brooklyn).



## WOUNDS, INJURIES, ACCIDENTS.

**I. Foreign Bodies in Wounds.** By A. FRANKEL. The author made a series of experiments upon rabbits, by introducing foreign bodies, such as soiled clothing, etc., with views of determining to what extent, these, of themselves, would prove harmful; comparing the results obtained between those unprepared and used directly from wear upon the body and presumably infected, those previously disinfected or sterilized, and those which had been purposely infected with the staphylococcus pyogenes aureus, streptococcus pyogenes, etc.

As a result of these experiments, Frankel concludes as follows: 1. Foreign bodies, passing into wounds, do not of themselves set up phlegmonous processes, but are covered in by the healing process without any considerable general or local disturbance. 2. This may be equally true of smooth bodies, as well as those which have surfaces and interstices upon and in which numerous germs may lodge. 3. Those foreign bodies which were infected with specific pathogenic germs peculiar to diseases arising in the lower animals, such as anthrax, as well as certain chemical substances such as croton oil, turpentine, etc., produced severe disturbances or progressive suppuration. The occurrence of tetanus is so rare that the entrance of earth and soil must likewise be comparatively dangerless, inasmuch as tetanogenic earth would be but seldom brought into contact with the wounded parts.

It may be said in commenting upon these experiments, that the wounds were immediately closed, and antiseptically treated, after the introduction of the foreign bodies. In cases of injury with the entrance of foreign bodies, the case is different. the wound remaining a longer or shorter time uncared for and consequently the further entrance of germs from the atmosphere is invited. Although at the present time there is no reason to suppose that the tissues of rabbits break down into suppuration more readily than those of man, yet experiments bearing upon these points are still wanting.—*Wiener Klin. Woch.*

GEORGE R. FOWLER (Brooklyn).

**II. Joiner's Varnish in Wounds and Ulcers.** By DR. DMITRY P. NIKOLSKY (Kyshtymsky Zavod, Russia). As a remedy for wounds

and ulcers of any kind, joiner's varnish has enjoyed a high reputation in the Russian popular medicine from time immemorial. Having happened to receive a wound, every joiner, carpenter or shoemaker at once resorts to painting the surface with varnish, feeling sure the lesion will rapidly heal without any further trouble. The fact that wounds and ulcers treated in that simple manner do actually often heal satisfactorily, has induced Dr. A. Skvortzoff (*Meditzinsky Vestnik*, 1883, No. 23) to try varnish in two obstinate cases of chronic crural ulcers. The results proved excellent; fetid odors at once disappeared, granulations rapidly assumed a healthy appearance, and the ulcer swiftly healed. Similarly, Dr. M. Krassovsky, of Yaransk, (*London Medical Record*, Dec., 1885, p. 522), successfully employed the dressing in 2 cases of burns and scalds. On the other hand, Dr. Toropoff (*Russkaia Meditsina*, No. 26, 1885), having tried varnish in 30 cases of wounds and ulcers, arrived at the conclusion that though being a good astringent, the substance is almost wholly void of any antiseptic properties, prevents the discharge of pus and contaminates the exposed surface. Further, Dr. Pokrovsky, of Arkhangelsk, stated (*Proceedings of the Arkhangelsk Medical Society*, 1885, Vol. II.), that varnish is absolutely harmful, since it retards the healing process and even causes various complications. Quite recently, Dr. G. I. Turner, of St. Petersburg, discussing the first aid in cases of accident, (*Meditzinskaia Beseda*, No. 3, 1889, p. 79), drew attention to varnish as a "very nasty thing" standing on a level with cob-web, masticated rye bread and such like means similarly used by the Russian peasantry in the treatment of wounds. In order to elucidate the matter, Dr. Mikolsky has recently undertaken an extensive series of careful experiments conducted after the following plans: Having washed out the ulcer or wound with a corrosive sublimate, or carbolic or boric solution, he thoroughly dried the surface with hygroscopic wool, painted it (by means of a brush) with varnish and then applied a soft gauze compress with wool and cotton bandages. In freely suppurating ulcers, he first powdered the surface with iodoform or subnitrate of bismuth and then painted with varnish. The results were invariably very satisfactory. For the sake of illustration, the author adduces six cases of atonic or sloughing crural

ulcers (mostly developing on the site of cut or lacerated wounds, or bites) in which (after an unsuccessful employment of iodoform, naphthalin, corrosive sublimate and such-like ordinary means) the varnish and dressing changed every 2 or 3 days, brought about healing in from 7 to 13 days, a marked improvement commencing already after the first dressing (pain lessened or disappeared altogether, granulations became more lively, pus thicker and less profuse, etc.). Similarly good results were obtained by the author in recent cut wounds. On the whole, Dr. Nikolsky comes to the conclusion that the varnish dressing though possessing relatively weak disinfecting properties, affords a very good astringent and hermetically protecting means which fully deserves the practitioner's attention, and that the more so that it is very cheap and simple, and allows the patients of working classes to remain on their legs all through.—*Russkaia Meditzina*, No. 28, 1889.

**III. Two Cases of Self-Mutilation.** By DR. IVAN S. KILDIUSHEVSKY (Bendery, Russia.) The author details two cases of self-inflicted lesions, both referring as usual to young soldiers trying to get rid of military service (*Cft.* Dr. A. A. Leshtchinsky's paper in *ANNALS OF SURGERY*, July, 1888, p. 49.) One of the patients was admitted on account of intense œdema of the right foot, swelling, redness and pain about the ankle-joint, a slightly elevated, shining, livid ovoid patch, measuring  $1\frac{1}{2} \times \frac{1}{2}$  cm. and situated near the inner maleolus. The patient stated that he had "stumbled against a threshold and fallen. Two days later, the patch transformed into a fluctuating tumor. On examining the region through a magnifying glass, a very fine scar could be discerned near the joint on its inner side. The tumor was incised, a sanguinolent flocky fluid escaping. The flocks proved to be as many pieces of some gauze fabric (in other words, the lesions had been produced by introducing under the skin some gauze impregnated with a caustic substance.) The temperature remained normal all through, except one evening, when it rose up to  $58^{\circ}$  C.

The other patient was admitted with double orchitis, right sided epididymitis, reddened and brown spotted scrotum, and right-sided inguinal bubo; all of which were attributed by the lad to his having

received "a blow on the testes by the butt-end of a gun five days previously." On the 5th day (since admission), the bubo became fluctuating, but the temperature remained normal. A free incision gave issue to 4 or 5 ounces of a blood-stained puriform matter. On the 9th day, a small puncture-like opening, discharging a sanguinolent fluid, appeared on the lower surface of the right side of the scrotum, and 3 days later on the left. On pressure, the latter yielded about 3 ounces of a blood-stained serum united with numerous bits of a thin transparent paper. Both of the patients speedily recovered and, of course, remained soldiers.—*Voëнно Meditzinsky Jürnal*, April, 1889.

VALERIUS IDEISON (Berne).

## BONES, JOINTS, ORTHOPÆDIC.

**I. Is Bone Tuberculosis Hereditary?** By JULIUS DOLLINGER (Budapest.) The author observed, several years ago, that the parents of children presented for treatment for tuberculosis of bony structures were rarely tuberculous themselves, but that either one of the grand-parents had died of pulmonary tuberculosis. More recently inquiries made among patients and their relatives reveals a fact not hitherto noted, namely, that tuberculosis of bone occurs most commonly in the grand-children of those who have either died as a result of or suffered from pulmonary tuberculosis. The bony structures are probably influenced by the tubercular tendency during the succeeding generation, becoming, so to speak, weakened and forming a favorable pabulum for the development of the bacillus of Koch.—*Centralblatt f. Chirg.*, No. 35, 1889.

G. R. FOWLER Brooklyn.(

**II. When Ought a Tubercular Vertebral Abscess to be Opened?** By DR. J. DOLLINGER (Budapest.) In 1883 Dollinger published a case of early operated psoas-abscess and described his method of reaching the same before it had progressed to Poupart's ligament. As this procedure has recently been condemned by Lorenz, Dollinger takes up the question anew on the basis of 15 later cases operated by him.

The asserted spontaneous complete resorption of such abscesses has not been anatomically proven. Those from the lower lumbar vertebræ may disappear by sinking into the pelvis. In one such case of his it reappeared, two months later, on the posterior surface of the thigh. Where the serum is absorbed a tubercular nest remains, that long subsequently may abscedize afresh or cause a general infection. Various other dangers too often prove real.

The only objection to the operation is that sometimes a fistula remains for a long while; but even this is advantageous in curing the tubercular focus. As to puncture and injection of iodoform-glycerine his experience is that so long as the ostitis persists the abscess always re-forms. Hence he now only uses it in those cases of psoas-abscess where the other symptoms indicate that the ostitis has run its course and only the abscess remains. When he does employ puncture he does not wait for the abscesses to present at Poupert's ligament, but to prevent secondary changes he punctures at the same place that he otherwise opens, close to the crista ilii as far up as the abscess. He injects about one-third as much iodoform-emulsion as he has drawn off pus, and has not had the subsequent fever for several days as described by Lorenz.

One of the most important questions in a case of vertebral disease is to determine whether there is an abscess or not. By patient palpation of the iliac fossa he is able to make out the smallest abscess.

For operating, the patient lies on the well side and an assistant steadies the abscess by pressing towards the iliac fossa. A 5 to 8 cm. long incision is made along the crista ilei, directly back from the anterior superior-spine in large abscesses, still farther back in small ones. The muscular attachments are quickly divided at the crista, and the subjacent fat separated, keeping all the time close to the inner surface of the os ilii. Sometimes further muscular bundles have been displaced, when the pearl-gray abscess-wall appears. After the abscess is incised and the pus has discharged, he wraps a finger in sublimate cotton and wipes out clean the pyogenic membrane from the abscess seat. Though he formerly made the counter-opening with the knife, he now takes a 26 cm. long, 12 mm. thick semicircular, sharp conically pointed steel

sound. The blunt end has cross-furrows for fastening thereto the drain. Guided by the fingers in the cavity the sound is made to bore through the soft parts at the outer border of the quadratus lumborum, so that only the skin over the point of the sound has to be cut. The front wound is closed down to the drain, and after sufficient sublimate irrigation an antiseptic dressing is applied. The flow of serum necessitates re-dressing the following day, but this quickly diminishes so that it need not be changed for several days. The drains may soon be removed. With a little practice the operation is completed in a few minutes. By keeping close to the crista not a vessel has to be ligated. No unpleasant accidents have occurred—it is only the opening of a deep abscess. Bako of Budapest operated one case on this plan some three years since, and with successful results.

Dollinger adds a recent case of acute infectious psoriasis operated happily in the same manner, thus avoiding the proposed trephining of ilium in such cases.—*Centbl. f. Chirg.*, No. 30, 1889.

WILLIAM BROWNING (Brooklyn).

### III. Compensatory Hypertrophy of Remaining Epiphyseal Cartilage of a Long Bone after Removal of its Fellow.

By L. OLLIER (Lyons.) The longitudinal growth of the long bones, depends, according to Ollier's researches, exclusively upon the epiphyseal cartilages, and ceases entirely if the latter are removed in toto. If that upon only one end is removed, the bone, as compared with the healthy bone, is retarded in its growth. After a total resection of the elbow Ollier observed in one case that the bones upon the side operated upon not only did not become shorter, but even somewhat longer than the bone upon the opposite side. In explanation of this extraordinary occurrence, the author supposes that after the removal of one of the cartilages the remaining one developed an increased activity of growth, (compensatory hyperplasia of the epiphyseal cartilages). This may result in an undue growth, and result in producing a relative lengthening of the limb.

Ollier selected a young animal and into the middle humerus he drove several nails; upon one side a total ultra-epiphyseal resection of the

elbow was performed. In from two to four months the parts were examined. The nail placed in bone of the operated side was invariably found at a point more distant from the upper end of the bone than that upon the opposite side. According to Ollier this fact can only be interpreted upon the supposition that the cartilages remaining at the upper end of the humerus developed a compensatory over-productiveness as compared to that of the other side. In this manner the tendency to progressive relative shortening following resection may be somewhat restricted. This compensatory hyperplasia may vary considerably in single bones, and in different individuals.—*France Médicale*, June 1, 1889.

G. R. FOWLER (Brooklyn.)

**III. The Treatment of Tuberculous Diseases of Bones and Joints by Means of Parenchymatous Injections of Iodoform Oil.** By DR. WENDELSTADT (Bonn). At the suggestion of Dr. Heusner, in Barmen, who for the past four years has successfully treated a number of tuberculous joints with injections of iodoform oil, Professor Tredelenburg has employed this method in a number of cases in his clinic, and had very gratifying results.

Injections of iodoform in ether, glycerine, or olive oil, have long been practiced by Mikulicz, Billroth, Verneuil and Bruns in cases of tuberculous abscesses, and in view of the clinical results obtained by them and many other surgeons, iodoform must be regarded as a prominent factor against the tubercle bacilli. That the presence of iodoform prevents the growth of giant cells in granulations has been proven by Marchand, and the fact that the abscess membrane of tubercular cavities injected with iodoform contains no bacilli has been demonstrated by Bruns and Nauwerk.

In the clinic at Bonn injections of iodoform ether 5% were at first employed, but although no toxic effects were produced on account of the small quantity of the drug used, severe pain was caused, and in three cases sloughing of the skin resulted. The ether was then replaced by olive oil, the proportions being 5:25, this latter was found to be free from disagreeable effects.

It is to be remarked, that the iodoform is to be mixed with the oil shortly before use, as otherwise iodine is rapidly developed, which may be recognized by the brownish-red color of the mixture.

After thorough disinfection of the skin in the neighborhood of the diseased part, 2 to 3 cm. of the mixture are injected into the tissues by means of a Pravaz syringe, having a fairly wide and sharp needle. The injections are to be repeated every eight days. If abscesses are present their contents are to be drawn off and the iodoform oil injected. If fistulæ have formed it will be found more advantageous to inject into the surrounding tissues, rather than in the fistulous tracts.

After the injections have been made a dressing of sublimate gauze is applied. In injecting fungoid masses, or the tissues in the proximity of fistulæ considerable force must be used to empty the syringe. The number of injections required until improvement is obtained varies considerably; in some cases signs of improvement are visible after 3 or 4 injections, in others many more are required. The pains usually become less severe after the first injections, and the swelling gradually subsides, becoming harder and firmer. Fistulæ are very obstinate, the secretion gradually diminishes, but complete closure only takes place after protracted treatment. The movements of the diseased limb are restored to a certain extent, especially if cautious passive movements have been practised. Complete fixation of the joint is only necessary if the pain is very severe.

The above described favorable results are only observed in certain cases; many patients are much improved, but not cured, and resort must be had to the knife. In general the injections have a very favorable effect.

The best and most rapid results from injections of iodoform oil are obtained in cases of recent development; specially when the disease began acutely. In a large number of cases the injections were preceded by opening of abscesses, or the curetting of the diseased parts, and recovery in these cases was more rapid than in those in which no injections were made. In several instances elevations of temperature were observed in the evening, or on the day following the injections, and was probably due to the fact that the oil was not



perfectly sterile. It is, therefore, advisable to sterilize the oil before use.

The danger of iodoform poisoning is not to be apprehended because the quantity of the drug injected is small, and because little absorption takes place in the diseased parts. In one case a considerable quantity of unchanged iodoform was discharged from an abscess three weeks after injection.

Patients not too severely diseased are treated in the out-door service, the injection being repeated every eight days.

Thus far Trendelenburg has treated 109 cases by this method, of which 28 were operated on in addition, 36 were cured, 38 were discharged improved and 12 were unimproved. Of 24 patients still under treatment, 14 show considerable improvement, and in the others the injections have not been used long enough to permit any judgement to be passed.—*Centralblatt f. Chirurgie*, No. 38, 1889.

F. C. HUSSON (New York).

## GYNÆCOLOGICAL.

**I. Foreign Body (Hair Pin) in the Uterus.** By DR. D. POPOFF (St. Petersburg.) A young woman, who had had two labors and, later on, an abortion, began to suffer after the latter from spasmodic uterine pain increasing during her catamenial periods. On one occasion, in order to "alleviate" the expected menstrual flow, the patient took a hair pin, straightened it, made a hook on one of the ends and, while standing with her legs spread wide, introduced the instrument into the vagina till her attempts at withdrawing the hook proved futile. Two days later she came to Professor A. I. Lëbëdeff's clinic with complaints of pelvic pain and hæmorrhage from her genitals. On examination the hair pin was found lying with its distal portion on the anterior vaginal wall while its proximal end proved to be firmly fixed, high up in the uterine cavity, the hook's curve therein looking to the right and backward (so the palpation through the posterior fornix showed) The uterine os was somewhat gaping and surrounded with erosions. The foreign body could be extracted only after the womb had been brought down by means of vulsellum forceps and the cervix dilated by

Hegar's instruments (up to No. 12). It could be then easily made free and extracted. The latter measured 16 cm. in length, the hook 3. Six days later the woman was discharged in a satisfactory state. Dr. Popoff has been able to collect 11 similar cases from international literature. In 4 of them hair pins were found in the uterine cavity; in 1 a metallic catheter; in 1 a piece of candlestick; in 1 bone; 1 a darning needle; 1 a seton needle; 1 a quill; 1 a small wooden stick. The author draws attention to the following facts: (1) Even a prolonged sojourn of foreign bodies in the womb does not give rise to any serious symptoms beyond some catarrhal discharge. (2) Even when introduced into a pregnant womb, foreign bodies may remain without any influence on pregnancy, the latter renewing its normal course after their withdrawal. (3) Sharp foreign bodies may penetrate through the uterine wall into the peritoneal cavity, while others having a certain shape may get into the cavity *via* Fallopian tubes (as Freund's and Kemperick's cases have proved).—*L'arch*, No. 18, 1889.

VALERIUS IDELSON (Berne).

**II. Primary Cancer of Female Urethra.** By PROF. IVAN M. LVOFF (Kazan, Russia). A highly anæmic and emaciated woman, æt. 46 years, sought the author's advice on account of extremely frequent, difficult and painful micturition. According to her statement, she had been always healthy until ten years ago, when she had begun to experience pain on passing water. For eight years the pain had been but slight and occasional, but subsequently had become so considerable and constant that she had been compelled at last to apply to a doctor. The latter had found vegetations about the urethral orifice and removed them. The vegetations, however, had rapidly reappeared again and again to be treated in the same way. When first seen by Dr. Lvoff in May, 1888, the patient had her urethra completely filled up with luxuriant polypoid new growths. They were removed partly by scissors, partly by ligature, which was followed by relief, but in July the symptoms returned with aggravated intensity. On examination in September, there was found "a bundle of rosy, soft, easily bleeding, tender papillæ, about 1 cm. long, protruding from the

meatus and growing out from the urethral mucous membrane all round." They occupied nearly two-thirds of the whole length of the canal, the urethral walls anteriorly being rather firm. Catheterization caused great pain and some hæmorrhage and was very difficult (in consequence of the blockage). The bladder and urine, however, as well as all external and internal genitals and all other organs of the body, proved to be perfectly normal. Neither could gonococci be found in the vaginal and urethral secretion. A careful microscopic examination of several papillæ excised showed that the new growth was nothing else than a tumor with flat epithelial cells. The treatment adopted consisted in a thorough excision of the whole new growth, together with the urethral mucous membrane as far back as the neck of the bladder, after which the canal was washed out with a solution of trichloride of iodine (1:2,000; *vide infra*), painted with a solution of perchloride of iron, and plugged with iodoform gauze. The plugging was kept up for five days. For a fortnight the urine was drawn off by a catheter. About the sixteenth day the patient's micturition became painless and regular, and she could be discharged. When seen six months later, the woman continued to be in best health. No stricture developed, a Nélaton's sound No. 18 passing quite freely into the bladder, and the meatus generally looking normally. Dr. Lvoff believes that his case is yet unique; at least he has been unable to find in international literature any other instance of a primary cancer of the urethra. [Trichloride of iodine (ICC.), introduced by Professor Langenbeck, of Berlin, is regarded by Professor Lvoff as the best antiseptic means of all yet known. The same high opinion has been formed by Drs. Levskin and Felser, of Kazan, who now use the drug in a routinary way in the surgical and ophthalmic clinics respectively. *Vide the St. Louis Med. and Surg. Jour.*, February, 1888, p. 108. *Reporter*].—*Vratch*, 1889, No. 34.

VALERIUS IDELSON (Berne).

**III. Upon the Intra-Abdominal Treatment of Displacements of the Uterus.** By G. RUGGI. The author's procedure is as follows: The patient is placed in the dorsal position, in a good

light from both overhead and the sides, upon a specially constructed table, with the head turned toward the side light, the shoulders slightly elevated, and the lower extremities elevated toward the pelvis at an angle of about  $45^{\circ}$ . The pelvis is by this means somewhat elevated, and the abdominal walls are relaxed, the intestines assume a position against the diaphragm, and are kept out of the way of the field of the operator without difficulty. The operator stands upon the right of the patient, the assistant standing opposite. The abdominal wound extends from the umbilicus to the symphysis pubis; the peritoneum is opened only sufficiently far to allow the left hand to enter comfortably. The uterus is now brought into its proper position, the right hand being introduced into the vagina, if necessary. If the correction is accomplished, the round ligament is relaxed, one of these latter is grasped by a fixation forceps, in order to steady the uterus, and the relaxed abdominal walls are drawn apart at the site of the incision by means of blunt retractors, so that the pelvic organs are easily brought to view in the widely gaping wound. By means of a strongly curved needle a stout catgut thread is passed through the round ligament, close to its point of entrance into the inguinal canal, tied, and then, for greater security, passed through the peritoneal fold of the round ligament, just below the suture, and again tied. The same needle and catgut are now passed through the uterine end of the round ligament, and by knotting the catgut at this point to that at the inguinal end of the round ligament, the uterus is to be drawn, as much as possible, toward the latter; the resulting doubling or loop of the round ligament is to be again sutured, the one fold to the other, with a double furrier's suture, whereby the solidity of the uterine support is increased. The same procedure is repeated upon the opposite side.

Fifteen cases thus operated upon since October, 1886, resulted in recovery, and at least temporary relief of the symptoms which led to its performance. A sufficient time has not yet elapsed to allow one to form an opinion as to the permanency of the cure. Prof. Gill Wyle, of New York, at a recent meeting of the Section on Obstetrics and Gynecology, of the New York Academy of Medicine, advocates an almost precisely similar procedure, and claims that during the three years

which have elapsed since he first resorted to it, he has met with excellent results in some cases.

GEORGE R. FOWLER (Brooklyn).

**IV. Battey's Operation.** By PROF. CLEMENTI (Italy). This method deserves to be seriously considered as it is a certain method of curing rebellious metrorrhagias. In the case of a woman *æt.* 40 years, operated on by me three years ago, the patient had suffered with very severe metrorrhagia for 8 years previous. The trouble was probably multiple fibro-myoma of the uterus. As every means employed had failed, I did a salpingo-oophorectomy, in preference to a supra-vaginal hysterectomy, the first operation being much less serious than the second one. The cure was complete in 19 days, and has persisted up to date, which makes 3 years.

The fundus of the uterus, which, before the operation, was 3 inches above the symphysis pubis, is now on a level with it. The general state is very much better. The only things of which the patient complains are headache and congestion of the face which occur at periods corresponding to menstruation. Is Battey's operation to be performed in all cases of metrorrhagia or tumors of the uterus? Yes, for cases in which all other treatment has failed.

Dr. Bottini.—Since the publication of Meyer's statistics, the operation of Battey has lost ground, and it seems to-day that the intervention is justified only in cases of grave hysteria. It is true, that after the extirpation of the ovaries the uterine tumors diminish in volume and cease to grow, but when the abdomen is open why should we restrict ourselves to the extirpation of the ovaries and leave the uterus in position?

Dr. Bassini.—Although I am very much in favor of the extirpation of the uterus, I nevertheless meet with cases in which I am obliged to employ Battey's operation; that is, in cases in which the tumor is interstitial and deeply situated in the posterior wall of the uterus. The results obtained have been good—cessation of metrorrhagia and sometimes a considerable diminution in the size of the tumor.

Dr. Durante.—By the electric treatment, much better results are ob-

tained than by oophorectomies. I think that before having recourse to the operation, the surgeon must first try the electric treatment; a few séances will be sufficient to tell whether or not electrolysis will do any good.—*Med. and Surg. Reporter*, June, 1889.

**V. A Case of Cæsarean Section.** By G. BOUILLY (Paris). The patient presented a regular contracted pelvis with a promonto-subpubic diameter of  $6\frac{1}{4}$  cm. In a former confinement basiotripsy had been performed. The period of pregnancy had passed without accident, and the patient appeared at the hospital at the beginning of her labor, the cervix not being effaced. An incision, 18 cm. long was made upward from the pubis. The anterior face of the uterus appeared at the opening and the entire body of the womb immediately projected without the abdomen, an occurrence which greatly facilitated the operation. An incision, 16 cm. long, was made through the anterior wall of the uterus, which was so thin that the scalpel scratched the skin of the child. The left shoulder presented, and the child was rapidly removed together with an intact placenta. The hæmorrhage was slight and easily checked by compression and an injection of ergotine. After the removal of the infant the incision contracted to 8 cm. The parts were injected with water at  $120^{\circ}$  F., and the uterine wound was closed by 10 silver sutures traversing the muscular tissue without touching the mucous membrane, and 10 superficial sutures applied to the peritoneum. The lumen of the tubes was closed by ligatures, to prevent another impregnation. The operation was concluded by a rapid peritoneal toilet and the apposition of the lips of the external wound by seven deep, and twelve superficial sutures, the entire operation having lasted an hour and a quarter. Both mother and child survived and did well.—*Société de Chirurgie de Paris*, March, 1889.

E. PILCHER (U. S. Army).

A CONTRIBUTION TO THE SURGERY OF THE  
BRAIN; ONE CASE EACH OF SUBDURAL  
CEREBRAL ABSCESS, AND OF HÆMOR-  
RHAGIC CYST, WITH HEMIPLEGIA,  
CURED BY TREPHINING AND  
DRAINAGE.<sup>1</sup>

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SURGERY IN THE WESTERN PENNSYLVANIA MEDICAL COLLEGE.

I HAVE lately had under my care at the Western Pennsylvania Hospital certain cases of paralysis involving different muscles which have been cured by operative procedures. They are instructive, and will be of interest to those who are studying the operative surgery of the brain, or cerebral localization.

I will report two of my cases :

CASE I. *Traumatic Cerebral Abscess; Trephining; Evacuation; Drainage; Cure.*—Frank M., æt. 15 years. Laborer. Entered March 14, 1889. Patient had been brought to the hospital from the boiler works, where he had been employed. He was injured by the flying debris caused by the explosion of a boiler, about one hour previous to his admission.

Upon examination a small scalp wound was found upon the left side of the head. And upon the *right* side of the head, over the parietal bone, there was quite an extensive burn. (It was afterwards learned that this burn had been caused by the head lying in contact with a piece of hot iron). The hair was completely burned off from the scalp,

<sup>1</sup>Reported to the Alleghany County Medical Society, November 19, 1889.

over a surface of four inches in diameter, and the scalp underneath was also badly burned.

*Treatment.*—Wound on left side of head, and burn on right side, both dressed antiseptically.

March 18. Pulse, 84; temperature, 99°. The small wound on left side is entirely healed. The burned scalp on right side has sloughed so as to expose the underlying skull. The exposed surface of bone is about two inches in diameter.

March 20. A line of demarcation has formed and exposed bone denuded of its perosteum in a complete circle as large as a silver dollar. Patient is sitting up in a chair, and feels comfortable.

March 22. Patient is very stupid this morning. Temperature, 102°. Complains of pain in right inguinal region; does not want to be out of his bed. Complains of pain in the right side of the head. When disturbed, face has the "Rissus Sardonius" expression, corners of mouth being drawn upward and outward. Ordered to be purged freely with calomel and to be kept upon a liquid diet.

March 23, 9 A. M. Patient was restless and delirious all night. Pulse, 90; temperature, 101°. Very severe pain in head; tongue coated and dry; very thirsty.

*Treatment.*—Pot. bromide, grs.xv. every four hours.

March 23, 6 P. M. Pulse, 96; temperature, 102°. Cannot answer questions intelligently; does not move either his left arm or left leg, nor does he seem to have sensation in either arm or leg; pupils are equal and respond to light.

March 24. Pulse, 98; temperature, 102°. Is in a comatose condition; cannot be aroused; passes both his urine and feces involuntarily.

March 25, 9 A. M. Pulse, 140; temperature, 103.6°. Respiration, 42; perspiring freely; teeth covered with sordes; Breath fetid; refuses to take nourishment.

March 25, 11 A. M. Patient taken into the operating room, and in the presence of the class of the Western Pennsylvania Medical College, was anesthized with the A. C. E. mixture.

After shaving the hair from the *right* side of the head it was observed that the exposed portion of skull was over the upper part of the fissure of Rolando.

By the advice of the hospital staff, who were present, it was decided to trephine through this exposed portion of the skull. A Galts trephine was used and a button of bone three-fourths of an inch in diameter removed. Nothing was found between the bone and the dura mater; and the dura presented no unusual appearance, but it was thought by



my friend and colleague, Prof. James McCann, to give evidence of fluctuation and by his advice the dura mater was cut through, when immediately there was an escape of fully an ounce of thick pus. The wound was washed out with Thiersch's solution, a drainage tube inserted and the wound dressed antiseptically. The removed button of bone was not returned to the aperture in the skull nor was the wound in the dura mater stitched.

The patient did not suffer greatly from the shock of the operation, and was returned to his bed much in the same condition as before the operation.

March 25, 6 P. M. Pulse, 140; temperature 103.2°. Condition about the same as before the operation; took a little nourishment in the form of milk.

March 26, 9 A. M. Pulse, 138; temperature, 102°. Was quite restless during night; this morning is able to answer when spoken to. Protrudes his tongue when directed to do so.

March 27, 9 A. M. Pulse, 126; temperature, 103.2°. Asked for something to eat, but was only allowed liquid diet. Is able to move slightly both his left hand and left leg when requested to do so. Can also feel the prick of a pin in leg and arm.

From this time forward a careful record of the patient from day to day was not kept or if kept the record is lost. It is however known that a fungus cerebri made its appearance a few days after the operation which proved very rebellious to treatment until it was ligated with a rubber band, which effected a rapid cure. The patient also suffered with abscesses in various parts of his body which were supposed to be pyæmic. He also developed bed sores on his sacrum. But notwithstanding these draw-backs he continued to improve in the use of his left arm and leg.

About June 1 he began to walk about the wards of the hospital upon crutches and soon after with the aid of a cane. He was discharged July 31, 1889, in full possession of his mental faculties, sensation and motion in his limbs being fully restored.

CASE 2. *Subdural, Hemorrhagic Cyst of Traumatic Origin; Hemiplegia; Trephining; Drainage; Cure.*—Maurice Meredith, æt. 24 years. Mulatto. Native of Virginia. By occupation a hod carrier. Admitted to Western Pennsylvania Hospital, May 24, 1889. The history obtained was that upon December 5, 1888, he was engaged as a hod carrier in the erection of a building. That he was standing upon a platform, upon which was a large quantity of brick, when the scaffolding supporting the platform gave way, and he fell

with the platform and brick a distance of 38 feet. Patient does not know what part of his body first impinged upon ground but has been told that he struck his side upon a barrel.

Upon his admission to the hospital there was a slight scar upon the outer canthus of the left eye, which he says was made by one of the bricks striking him in the fall. After the fall he became unconscious for about an hour.

On recovering his consciousness he discovered that he had lost all power of motion and sensation in his right arm and leg. We have no further history until his admission to the hospital.

On his admission to the hospital May 24 (nearly six months after the injury) his condition was as follows.

Mind clear; answered all questions readily and intelligently; pulse and temperature normal; pupils equal, and respond to light; no deviation of tongue to either side when protruded; tongue slightly coated and bowels somewhat constipated; no history of syphilis, either hereditary or acquired; urine passed with some difficulty. There was complete paralysis of the right arm and right leg, both of motion and sensation, and at times a peculiar trembling of the left side. This latter symptom was especially observed when the patient was permitted to sit in a chair. Pain was complained of in the region of the left eye and at top of the head. Upon a careful examination no fracture or depression could be discovered upon any portion of the skull, nor any scar upon the scalp except as before mentioned at the outer canthus of the left eye. The spine was also carefully examined without finding any signs of injury.

Patient was treated with a prolonged course of mercury and iodide of potassium. He also received treatment by the galvanic battery, and massage was also diligently employed. Under this treatment he gained in weight. Appetite and digestion improved, and all functions properly performed, but there was no improvement in the paralysis of arm or leg.

September 27. The patient was brought into the operating room for the purpose of being trephined and in the presence of the class was first examined.

The paralysis of motion and sensation was shown to be complete in the right arm and leg. Every effort was made to induce the patient to move as much as a finger or toe without success. He was also pinched with the fingers and pricked with the point of a knife, but no evidence of sensation could be produced in the upper extremity until the breast in front and the scapular region behind were reached. In the lower

extremity no evidence of sensation was found below the lumbar region.

The head having been shaved and the patient anæsthetized, the Rolandic line was located and marked upon the scalp with the tincture of iodine, according to the rules laid down in our modern text-books. After being thoroughly anæsthetized, the operation of trephining was performed, under strict antiseptic precautions. A semi-lunar incision was made through the scalp, and the scalp flap, together with the pericranium, raised from the skull. A large trephine was used, one taking out a button of bone  $1\frac{1}{2}$  inches in diameter. The portion of bone removed was from the left parietal bone over the upper third of the fissure of Rolando. Upon the removal of the button of bone, the dura mater bulged up through the opening and gave a sense of fluctuation to the finger when pressed upon it. But no fracture or fissure of the bone was found, nor was there any evidence of clot between the bone and dura mater. An incision was made through the dura, when immediately there was the escape of a dark grumous fluid, thinner and darker than venous blood. After the escape of this fluid, when the finger was pressed upon the cortical substance of the brain it broke down under the least pressure and a small quantity of brain substance, almost in a fluid condition, escaped from the opening. This is all that was found and it was feared by the operator that no good could result from the operation.

During the operation, after the removal of the button of bone, the patient suddenly ceased to breathe and it was some time before respiration could be restored. But by the use of artificial respiration and elevating the foot of the table, together with the hypodermic injections of ether and whisky, the patient revived, and we were able to continue, and complete the operation.

The incision in the dura mater was carefully stitched together with a catgut suture, a rubber drainage tube inserted, the wound in the scalp brought together by interrupted sutures of silver wire, and the moist bichloride dressings applied. The button of bone was not returned to the opening in the skull.

During the twenty-four hours following the operation the condition of the patient was critical in the extreme. He suffered much from shock and reacted slowly.

Hypodermic injections of whisky and enemata of beef tea and whisky were administered every two hours, the foot of the bed during this time being elevated, and the patient surrounded by bottles of hot water.

September 27, the day following the operation, the patient has re-

acted from the shock, is able to move the toes of his right foot. Can also pull his foot up in bed and feebly flex and extend the right leg at the knee. He has also sensation in this leg. Can tell the point touched when his eyes are blindfolded.

To his right arm sensation has returned but not motion. Pulse, 112; temperature, 101°.

October 3. To-day, Meredith, while talking to the patient, in an adjoining bed was suddenly attacked by a difficulty of speech which seemed to be ephasic in character; there were also convulsive twitchings of the muscles on the right side of his face. These convulsive movements lasted about twenty minutes and then passed away. After this attack the mouth was slightly drawn to the left side and the tongue when protruded was inclined slightly to the right side. (Previous to the operation there had been no paralysis of the muscles of the face or tongue.)

October 13. Removed dressings from scalp. Wound has healed throughout its entire extent. Drainage tube removed. Patient is able to walk about with the aid of a cane and by being supported on one side, but cannot move right arm.

October 17. Patient improving. Motion returning in right arm.

October 19. Patient is able to walk without any assistance. Was taken into the operating room, and exhibited to the class of medical students. Temperature and pulse normal.

November 19. The patient was taken to the Alleghany County Medical Society and there exhibited to the members. To reach the hall where the meeting was held, from his ward in the hospital, he descended a flight of stairs, rode more than a mile through very rough streets in a sitting posture; ascended two long flights of stairs to the hall; remained at the hall more than an hour; walked about the hall unassisted without cane or crutch; shook hands with the members and returned to the hospital by the same route as he had come. This did not fatigue him, for he was walking about the hospital the next day as has been his custom every day for the past month.

This man is now virtually restored to health. With the exception of a little difficulty in extending his right hand at the wrist joint there is no loss of function in either the arm or leg.

What the exact pathological condition was in this case, and how the operation of trephining succeeded in restoring the powers of motion and sensation to the paralyzed muscles, I can-

not explain. I have, as well I am able, endeavored simply to state the facts of the case, leaving it for those more learned than I to make the explanation. Before beginning the operation I fully expected to find a spicula of bone pressing upon the brain or more clear evidence of a clot than was found. It is probable that the dark fluid which escaped after opening the dura mater was the remains of a broken down clot; perhaps in the softened condition of the cerebral substance, the explanation will be found. But if in neither of these the true pathological condition existed there can be no doubt that in some way there was relief given to pressure upon some portion of the brain. The relief followed so soon after the trephining in both of the cases reported, that, in the absence of any other treatment I think we are justified in thinking of them as standing in the relation of cause and effect.

Whatever of credit there may be given to the operation in these cases must not be given altogether to the operator. He wishes here to state that to his colleagues, especially Professors McKennan and McCann, who advised the operation and assisted in its performance, equal credit is due.

The operative surgery of the brain is yet in its infancy and it is the duty of every surgeon to report his cases.

It is in obedience to this obligation that I have rerorted these cases.

# ON THE INTERSCAPULO-THORACIC AMPUTATION WITH REPORT OF A CASE.

By EDWIN A. LEWIS, M.D.

OF BROOKLYN.

PROFESSOR OF ANATOMY IN, AND SURGEON TO THE LONG ISLAND COLLEGE HOSPITAL; SURGEON TO THE BROOKLYN HOSPITAL.

THE PATIENT, native of the United States, æt. 47 years, photographer by occupation and latterly farmer, in the month of November, 1887, was thrown from a carriage striking on his left shoulder. The attending surgeon said he had a fracture and dislocation. Has never been able to use the arm well since the accident and has suffered considerable pain. The shoulder has been gradually enlarging.

About April 1, 1889, the arm suddenly gave out; since which time he has practically lost the use of it and has suffered great pain.

Family and personal history good. Patient was admitted to the Brooklyn Hospital, April 26, 1889. Examination shows general health to be good. Strength somewhat reduced from suffering.

Left shoulder is much enlarged, but not very tender to manipulation. Motion of shoulder joint very limited. Diagnosis osteosarcoma. Operation requested.

April 29 the operation was performed. The subclavian artery was first tied in the third part of its course. This was a matter of some difficulty on account of the encroachment of the tumor, the artery being pushed down and in. The scapula and outer half of the clavicle were removed with the upper extremity. Drainage was established at the lower angle of the scapula. All antiseptic precautions were taken. Patient suffered from severe shock but rallied well.

The amount of hæmorrhage was not very considerable. The only artery tied was the subclavian. On the third day the drainage tube was removed from the lowest part of the wound where the lower angle of the scapula had been. About two drachms of sanious aseptic fluid followed. This was the remains of the douching of the extensive ex-

posed surface at the time of the operation and was not the product of any inflammatory process. The entire wound healed by first intention except one part of the incision along the line of the clavicle about  $\frac{3}{4}$  of an inch in length. This granulated. Patient's temperature hardly went above normal. There was no discharge of pus or blood. Patient was anxious to sit up within a week of the operation. The treatment of the original injury must have been skillful as the line of the humerus proved to be good and the head of the bone was in place but of course very much enlarged by the morbid growth.

A small portion of the wound at the lower angle also granulated but no pus formed from the large surface exposed by the operation.

Since the operation the patient has gained in general health and strength. He is now heavier and in better condition than he has been for many years.

On examination eight months after the operation, the line of incision shows the two small points that healed by granulation, one at the middle of the clavicle and the other at the lower angle of the incision.

There is a point of great tenderness near the lower angle of the incision. By gentle palpation the bulbous extremities of some of the brachial plexus of nerves can be felt. I have advised him to have these nerve trunks resected. It will be an operative procedure of no special gravity and will undoubtedly relieve the remaining tenderness about the site of operation.

There is not the slightest indication of any return of the disease at any point.

#### *Report of Pathological Examination of the Tumor.*

Analysis of the tumor and arm with the scapula and outer third of the clavicle reveals the following facts:

Length of entire arm from its lower extremity to upper edge of tumor  $12\frac{1}{2}$  inches.

Distance from lower border to upper border of tumor, 4 inches.

Greatest thickness,  $3\frac{1}{2}$  inches.

Least thickness, 3 inches.

The mass is irregularly spherical, fairly firm in consistence, and involves the head, neck and upper portion of shaft of humerus, as well as the muscular and superficial and tegumentary structures around the bone.

There is rarefying osteitis involving the internal portion of the shaft of the humerus extending its entire length to the condyles—the bone is thinner than normal, and roughened on its inner surface. The shaft at

its upper extremity is honey-combed with the material composing the tumor tissue.

The neoplasm is in spots very soft, in other places hard and firm. The central portion contains considerable bone, and the softer portions contain same material in small spicules.

Microscopic examination of the tumor reveals it to be a typical osteosarcoma, with the usual vascular supply. There are many multinuclear giant cells surrounded with smaller large round cells. There is a small amount of stroma intimately associated with the individual cell, and everywhere imbedded in mass of cells are bone spicules containing typical lacunæ and canaliculi. The center of the mass contains considerable bone substance which is honey combed throughout, and is probably the remains of the head of the humerus.

The head of the scapula is excavated by a rarifying osteitis. There is a round opening from the surface of the eroded glenoid cavity extending towards the neck for half an inch and having a diameter half an inch. There seems to be some shortening of the neck bone; and the space just described contains tumor material with intermixed small spicules of bone.

Ashhurst has tabulated 51 cases of this operation, which show a mortality of about 25%. Dr. Stephen Rogers, of New York, in the January number of the *New York Medical Journal*, 1869, publishes a table of operations for partial or complete excision of the scapula. There are 64 cases. Of these, 15 included removal of the arm and part, or all of the clavicle. The mortality in these cases was 20%. Many other cases have been reported singly and, doubtless, many not reported at all. The operation seems to be sufficiently rare to warrant the reporting of every case, whatever the result, for the purpose of assisting in statistics. The most complete table that I have knowledge of is published by Berger, of Paris, in a monograph on this subject. He reports 51 cases, the same number as Ashhurst, but analysis shows that he mentions only 25 of the same cases. Therefore, he reports 26 cases not mentioned by Ashhurst.

His conclusions, from a critical review of the history of each case, point to a death-rate rather less than mentioned by



Ashhurst' *i. e.*, about 20%, instead of 25%. A resume of some of his facts and conclusions may not prove uninteresting:

He first claims that the operation should be named. The text books at present speak of amputation as any amputation above the shoulder joint. Berger suggests that it be called amputation of the upper extremity next to the trunk, or "The Interscapulo-thoracic Amputation."

It seems that this name would designate the operation better than the more general term now used.

The first case on record seems to have occurred in 1737 and is mentioned by Cherelden.

An English naval surgeon operated in 1808, and next Crosby in 1836. Of the 51 cases of Berger, 38 were rendered necessary by morbid growths, principally osteo-sarcoma. Of this 38, 22 had the whole operation done at once, while in 16 cases there were two or more operations. Of the 22 mentioned, 17 made a recovery more or less durable, but 5 died from causes attributable to the operation, from a few minutes to 6 days after the operation. One of this 5 may be fairly excluded for the purpose of statistics, as the disease proved to be so extensive that the thoracic cavity was opened during the operation. It was not a case that can be considered a test of the operation. The patient survived but a very short time.

Of the 16 cases where two or more operations were performed, 3 died at times varying from the same day to eleventh day and from causes fairly to be attributed to the surgical interference.

This makes 7 deaths in 37 cases, or practically 19%.

The remaining 13 cases of the 51 in the table show a mortality of 4, or nearly 31%, the combined mortality of the two classes of cases being 22%. The mortality in the second class of cases is influenced largely by other causes than the operation, *i. e.*, by shock, injury and hæmorrhage.

Ashhurst gives a mortality rate of 25.5% in his 51 cases, while Dr. Stephen Rogers, of New York, in his table published in January, 1869, in the *New York Medical Journal*, mentions 15 cases, with a mortality of 20%. Neither of these 2 gentlemen separates the operations done for disease from those performed

for injury. Berger gives a brief history of each of his cases and makes the division above referred to. His conclusions may be considered the most reliable. It would seem, therefore, that the mortality thus far in the history of this operation is about 20% in those cases where the interference is on account of diseased tissue, and 30% or over where the operation is done for recent injury.

Antiseptic surgery will, doubtless, lower this percentage a good deal for, of the 11 deaths noted by Berger, no less than 4 were due to sepsis, 2 to shock, 2 to hæmorrhage, 2 to exhaustion and the cause of one is not known.

# EXTENSIVE CIRSOID ANEURISM OF SCALP OBLITERATED BY MULTIPLE LIGATURES.

By HERMAN MYNTER, M. D.,

OF BUFFALO.

PROFESSOR OF SURGERY, NIAGARA UNIVERSITY.

MRS. D., æt. 43 years, entered the Buffalo Hospital of the Sisters of Charity, October 19, 1889, with the following history : The patient was formerly greatly addicted to drink. Eight years



FIGS. 1 AND 2.—CIRSOID ANEURISM OF SCALP; CONDITION PREVIOUS  
TO OPERATION.

ago, while in a drunken fit, she was making a great deal of noise and yelling murder. She was forced to the floor and to stop her noise received a slight slap in the face. When she recovered from the effects of the

liquor, her right forehead was reddish and the arteries in that region were pulsating more than normal. This increased until the present time and she now presents the following symptoms: The right temporal artery and particularly its anterior branch is greatly enlarged, extending in a tortuous way over the forehead. Here and there circumscribed dilatations are seen, some as large as a hickory-nut. Left temporal artery similarly affected, although in a slighter degree. Over and anterior to the right ear is seen a rather large pulsating tumor, formed from anastomoses with the posterior auricular and the temporalis media artery. A similar but smaller tumor is seen over the right eyebrow, formed from anastomosis with the superior orbital artery. The right cheek has a nævus-like appearance, the conjunctiva of right eye is diffusely red from enlarged vessels. During the whole length of the tortuous arteries grooves are felt in the bone, corresponding to the size of the artery and produced by absorption of bone on account of the pulsation.

The absorption of bone seems here and there almost to have gone through the internal table. A distinct thrill is felt everywhere and with the stethoscope a distinct loud aneurismal murmur is heard, which disappears by pressure on external carotis. The patient complains of heat and fullness in the face and of a loud pounding sound, when she lies down, also of frequent profuse hæmorrhages from the right nostril. Her reddish, swollen face gives her such an appearance that she scarcely ever is willing to leave her house in daytime. Otherwise she is in a healthy condition and has not drunk any liquor for the last year.

Under ether narcosis the right external carotid artery was ligated under the posterior belly of the digastric muscle. The murmur and thrill immediately disappeared. The left temporal and the enlarged arteries were thereafter ligated subcutaneously in eleven places with antiseptic silk ligatures, which were introduced under the arteries by aid of a sharp-pointed, curved Hagedorn's needle. The silk ligatures were thereafter tied over pieces of thick drainage tubes. The field of the operation was profusely dusted with iodoform and dressed antiseptically. The first dressing was removed seven days later.

The wound over the carotis externa was found healed by first intention. Over the whole forehead a remarkable change had taken place, the redness had disappeared, the conjunctiva was almost white, and the arteries had more or less disappeared. On no point had the subcutaneous sutures produced inflammation or sloughing. The drainage tubes were seen almost buried in deep grooves of the skin, but by lifting up their ends, the underlying skin was seen healthy. They were

therefore left in their places for a week longer and then removed. Three enlarged but not pulsating arteries in front of right ear were then similarly ligated and the ligatures kept in place for eleven days. The patient left the hospital November 9, with scarcely any traces of her disease, no thrill or murmur, with white cornea and white forehead. and she may now, December 1, be considered perfectly recovered.

# MIESCHER'S OR RAINEY'S CORPUSCLES IN ACTINOMYCOSIS.

By HENEAGE GIBBES, M.D.,

OF ANN ARBOR.

PROFESSOR OF PATHOLOGY IN THE UNIVERSITY OF MICHIGAN

THESE structures have been described by many observers but there has always been a doubt as to their nature.

Claus in his text book of Zoology, translated by Sedgewick (1884) figures them and describes the appearance shown as an animal inside a muscle fibre. In a portion more highly magnified a number of rod-shaped bodies are shown and small round particles, which are called spores. Ziegler alludes to them and says: "They are cylindrical or tube-like bodies, found not infrequently in the muscles of the pig, ox, sheep and mouse. They contain an innumerable multitude of small oval or reniform corpuscles. Nothing is known of their effect on the human system."

By far the most voluminous account is given in Leuckart's "Parasites of Man," translated by Wm. E. Hoyle, M.A., 1886. He says, in speaking of *coccidium oviforme*, "whether structures somewhat similar to the above, these 'Miescher's tubes' (*synchybium Miescherianum*, Zopf) are to be referred to the class *sporosoa*, is more doubtful, since no phenomena of movement have yet been observed in any developmental stage.

"Since, however, they usually rank with the *psorosperm-saccalis*, in accordance with a division, which I was the first to give (this work, first German edition) and have indeed many points of resemblance with these forms; a brief discussion of their nature is necessary."

He states they are of common occurrence in pigs, oxen, sheep

and even deer. They were first noticed by Miescher in the muscles of a mouse.

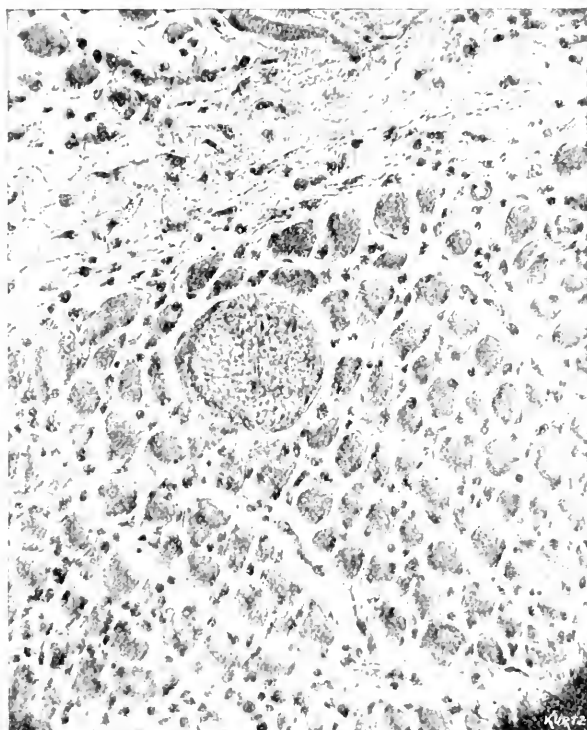


FIG 1.—TRANSVERSE SECTION OF ACTINOMYCOTIC TONGUE OF COW, SHOWING MIESCHER'S CORPUSCLES.

They "appeared as cylindrical tubes filled with countless kidney-shaped bodies." He also states that "similar tubes were seen by Hessling in the muscle of the roe and other

mammalia inside the muscular fibres, and surrounded on all sides by the striated sarcous substance. His observations and

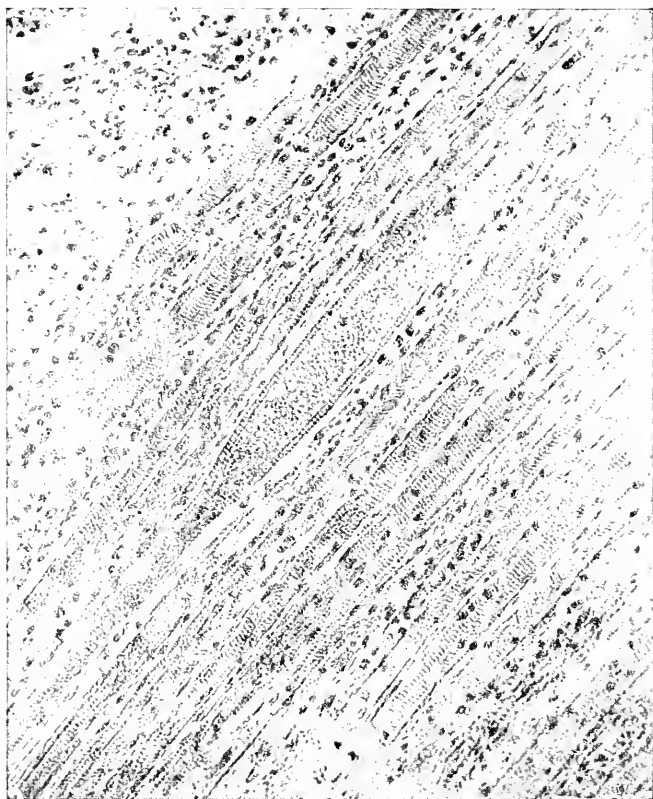


FIG. 2.—LONGITUDINAL SECTION OF ACTINOMYCOTIC TONGUE OF COW, SHOWING MIESCHER'S CORPUSCLES.

Rainey's proved that the occurrence of these bodies inside the muscle fibre was constant. He states they have not been



found elsewhere, although numerous observers have devoted close attention to them.

In describing the minute appearance he says, "Inside the cuticle, embedded in a tough, somewhat homogenous, matrix lie a countless number of microscopic (0.01mm) kidney-shaped or bean-shaped bodies."

Further on he says, "These structures are not equally scattered throughout the protoplasm of the tube but are arranged in groups."

He also states that a pig proved to be free from these tubes was fed with them, and was afterward found to be infected with them.

The above account gives, as far as I know, all that has been made out concerning these structures. In examining some cases of actinomycosis bovis, I found that many of the muscle fibres of the tongue contained structures which appeared to be identical with those described and figured by Claus and Leuckart. On reading their descriptions, I found the statements so ambiguous I determined to work the matter up thoroughly. The material used was the tongue of cows affected with actinomycosis, hardened in the usual manner with a mixture of chromic acid and spirit. A large number of sections were made and the mycelium and rays found throughout, but the rays were more frequent in the tissue under the epithelium, where they had caused local inflammatory action.

In all the specimens I have examined the rays are very small, and nothing like the size figured by many recent writers.

I have found that almost every section contained one or more muscle fibres, either cut longitudinally or transversely, having in its interior the so-called Miescher corpuscle. The accompanying illustrations, made with a Beck  $\frac{1}{10}$  inch, giving a magnification of 130 diameters, show very well the appearances presented.

In the ordinary specimen stained with logwood, these corpuscles present a granular appearance, but with a  $\frac{1}{12}$  oil immersion some rod-like structures could be made out. I tried

other staining agents but could not bring out any thing more definitely. I then had recourse to double staining and found that some of the substance in the corpuscles gave a different chemical reaction to the rest. I tried various combinations, and I may mention here that double and treble staining has been of the utmost value to me in solving many difficult points in minute histology and pathology. I read a paper on this subject before the Royal Microscopical Society in 1880, and since then I have had occasion to modify some of the processes but the method is the same. I have to use colors that will not combine in the sections, but will differentiate various elements. I find picro-carminé still the best ground stain and I always stain deeply with it, before trying other colors, in this way the connective tissue, muscle, fibres, etc., are colored red to begin with. Having stained in this manner the sections of cows' tongue, I found that the contents of the corpuscles were still uncolored. My object was to find out a stain which would color the rod-like bodies which were dimly visible, with a high power in the corpuscles. After a number of trials I found that I obtained the best result with an aqueous solution of Spiller's purple 2%, this gave the rods a decided color and did not stain the surrounding granular matter. I was now able to study them with the highest powers and I found that they were quite distinct from the granular matter surrounding them. On examining some of the inflammatory nodules in the sub-epithelial tissue I found that the rays were highly colored exactly the same as the rod-like bodies in the corpuscles inside the muscle fibres, and on comparing the two they appeared to be identical. I noticed that the mycelium in the sections had a faint yellow tinge from the picro-carminé, and on closer examination I found the same in the granular matter of the corpuscles.

From a careful examination of specimens prepared in the manner described I have drawn the following conclusions:

1. The so called Miescher's or Rainey's corpuscles are produced by the growth inside a muscle fibre of the ray fungus of actinomycosis.

2. That the kidney-shaped or bean-shaped bodies described by Leuckart and others are the rays of the fungus.
3. That the granular matter in which these seem to be embedded is the mycelium of the fungus.

CASE OF RUPTURE OF QUADRICEPS FEMORIS  
TENDON WITH DISLOCATION OF PA-  
TELLA BENEATH THE INTER-  
CONDYLOID GROOVE OF  
THE FEMUR.

By C. DEADERICK, M.D.,

OF KNOXVILLE, TENN.

THE PATIENT, a strong muscular youth, æt. 19 years, while attempting to board a moving railroad train, May 23, 1889, fell and dislocated the left patella. The bone was completely torn loose from its attachment above and turned on its lateral axis  $\frac{2}{3}$  of a circle, its longitudinal axis forming an angle of about  $45^{\circ}$  with the tibia. A few hours after the accident the patient was chloroformed, and strenuous efforts made by Dr. E. S. Rodgers and J. S. Carriger of Knoxville, and Drs. Shields and Gamble, of Concord, to force the patella back into position. The day after the accident Drs. E. S. Rogers, Shields and myself chloroformed the patient again, (the parts being very much swollen and very sore) and worked hard for more than an hour. We inserted a four pronged steel hook through the soft parts and into the bone, and pulled with great force. We flexed the leg to various angles, but the patella seemed riveted in the subcondyloid fossa, and we were compelled to score another failure.

I then had a small windlass made, consisting of a half inch iron rod with a long crank at one end, thimble or socketed on two iron posts, an inch high; these posts were bolted to an oak board, one inch thick, six inches wide and four feet long.

The windlass was placed under the leg, a cotton cord  $\frac{1}{4}$  of an inch in diameter was attached to the spindle and thrown around the elevated edge of the patella and the leg held extended. The line of tension on the cord formed an angle of about thirty degrees with the femur. I think with this little machine, one man could exert force enough to lift an ox, and although the power we used was sufficient to have raised several hundred pounds, the direction of the force deviated so much

from the axis of the thigh that the patella would not make the turn. We removed the cord, I grasped the lateral edges of the patella with my left hand, drew it upward or away from the joint, pulled on the upper edge of the bone with my right hand in the direction of the axis of the thigh, when with a sudden jerk the patella turned and fell into its normal position. We had repeatedly tried this same manipulation without effect, but the force we had exerted on the cord had evidently stretched the ligaments so that we were enabled to partially lift the bone out of the subcondyloid fossa.

This particular kind of dislocation of the patella must be exceedingly rare and I have not been able, so far, to find any description of downward dislocation of any kind. The *International Encyclopædia of Surgery*, Holmes, Bryant, Erichsen and others, do not mention its occurrence, while Gross, in his *System of Surgery*, says, "displacement downwards is altogether impracticable."

NOTE ON THE PATHOLOGY OF SUBLUXATION  
OF THE HEAD OF THE RADIUS IN  
CHILDREN.

By RICHARD VAN SANTVOORD, M.D.,

OF NEW YORK.

IN THE article on "Subluxation of the Head of the Radius in Children," by Dr. W. W. Van Arsdale, in the *ANNALS OF SURGERY*, for June, 1889, a reference is made to some experimental work of my own, which, I think, is misleading. Since I was unavoidably prevented from discussing the paper at the time it was presented before the Surgical Section of the New York Academy of Medicine, I venture to submit the following comments through the *ANNALS OF SURGERY*.

Dr. Van Arsdale's citation of my paper implies that I supported the view that the lesion consisted in an interposition of the capsular ligament between the joint surfaces. As a matter of fact, my experiments demonstrated to my own satisfaction that a more or less complete dragging out of the head of the radius from within the annular ligament occurred, with some stretching or laceration of the capsular ligament. This latter explanation is, I believe, that which is most generally accepted. The Doctor objects to it that it depends for support on experiments on the cadaver, in which the element of muscular tonus and active resistance does not occur. (2) That no observable ecchymosis is observed clinically in these cases, such as ought to result from laceration of the joint capsule. (3) That the snap heard in cadaver experiments is of a different character from that felt during examination of the injured children. "It is of softer quality, and the resistance to supination is not so well marked"

He inclines to accept the theory that some local injury of

the head of the radius within the joint capsule, such as a partial solution of the epiphysis of the radius, occurs, produced by the lateral jerk of the biceps when the child catches at the nurse's hand to save itself from falling. "After replacement, the head of the radius is held in position by the muscular tonus, which causes the capitellum of the humerus to press down upon it." "There is no tendency to displacement, unless the accident is repeated." "The mechanical resistance to supination may be explained by the excentric configuration of the head of the radius, the epiphysis pushed partly to one side, impinges upon the ulna, until forced supination overcomes the resistance and reduction is accomplished at the same time."

The excentric configuration does not in any way interfere with the movements of the normal joint. I cannot conceive how the releasing of the smooth head of the radius from its supposed impingement against the ulna can cause the sharp snap that accompanies reduction, or how impingement of the head of the radius against the ulna can be produced by jerking the arm downward, or the jerking of the radius forward by the biceps. The biceps would have to act by jerking the head of the radius against the head of the annular ligament. If it can produce a "partial solution of the head of the radius" by so doing, it ought sometimes to produce a total separation, an accident which would obviously be a very grave one, giving rise to permanent disability to the joint. If the biceps had produced a sufficient lesion of the epiphysis to cause symptoms the tendency to displacement would be most certainly marked, yet the cases are almost invariably trifling.

The more this view of the matter is analyzed the less tenable it seems to be.

Now with reference to the first mentioned theory, it is to be urged that in the cadaver a condition of affairs can be produced which is objectively identical with that observed in the living. The same manipulations produce the same results in attempts at reduction in both the living and the dead. I am not able to confirm Dr. Van Arsdale's experience as to there being any essential difference in the character of the snap on reduction, or the nature of the resistance on manipulation.

There can be no doubt whatever that in the cadaver this condition of affairs is produced by a dragging out of the head of the radius, especially its anterior portion, from within the annular ligament. The snap occurs during reduction when the ligament slips back into place. In my experiments I demonstrated that two factors were potent in effecting reduction. (1) In the injury as it ordinarily occurs, the outer fibres of the capsular ligament are shortened by torsion during forced supination and drag back the annular ligament into place. (2) In some cases the forcible pressing of the head of the radius against the condyle of the humerus, especially when combined with forced flexion, forces out the wedge-shaped edge of the ligament from between the two bones, like a wet melon seed pressed between the thumb and forefinger. This, of course, would effect reduction only when the anterior edge of the annular ligament was alone interposed. The various deviations from the usual type of this injury can be so completely reproduced and so thoroughly explained, as may be seen by reference to my article in the *New York Medical Journal*, January 15, 1887, p. 63, that to my mind the evidence is conclusive that the symptoms of the injury under discussion as observed in life, are due to the same lesions which produce exactly similar objective phenomena in the cadaver.



## EDITORIAL ARTICLES.

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### PROSTATECTOMY BY THE SUPRAPUBIC ROUTE FOR URINARY RETENTION FROM HYPERTROPHY OF THE PROSTATE AS PRACTICED IN THE LEEDS GEN- ERAL INFIRMARY.

Twenty-four cases, in which prostatectomy through a suprapubic incision had been done by various surgeons at the Leeds General Infirmary, for the relief of urinary retention caused by hypertrophy of the prostate body, were reported to the British Medical Association in August, 1889, by Mr. McGill. The report in full, with the discussion following, may be found in the *British Medical Journal* of October, 19, 1889.

Mr. McGill accompanied the statistics with a discussion of the general subject of the treatment of those cases of retention of urine from prostatic enlargement, in which chronic retention is a leading feature. He systematised his remarks under six general theses. His first point was that "*the prostate enlargements which give rise to urinary symptoms are intravesical, and not rectal,*" calling attention to the fact, long recognized, that the severity of the symptoms in a case of hypertrophy of the prostate bears little or no relation to its apparent size as felt through the rectum. Prostates of immense size which project toward the rectum and perineum may cause no urinary trouble while severe symptoms may supervene when the prostate on rectal examination is apparently of normal dimensions.

The intravesical growth may present many varieties; there may be (1) a projecting middle lobe—pedunculated or sessile; (2) a middle lobe with lateral lobes forming three distinct projections; (3) the lateral lobes alone; (4) pedunculated growth springing from a lateral lobe;

and (5) a uniform circular projection surrounding the internal orifice of the urethra.

The author's second thesis is "*that retention is caused by a valve-like action of the intravesical prostate, the urethral orifice being closed more or less completely by the contraction of the bladder or its contents.*" The mechanism is the same in all cases except in cases of small sessile middle lobe, situated partly in the bladder and partly occluding the prostatic urethra, in which case the passage is blocked by the projection without valve action. In all other cases where the valve action is present the more violent the contraction the more complete is the action of the valve. When a patient, finding that he is unable to relieve himself, ceases his violent expulsive efforts, the pressure on the valve is lessened, the urethral orifice is released and urine flows away in a feeble stream. If he attempts to expel it more quickly, the outflow is again stopped, and it is only after several attempts that incomplete relief is obtained. Though the bladder still contains urine, no more can be forced from it. The amount of the residual urine varies much in different cases. Its pressure and the consequent frequency of micturition is accounted for by the fact that a more violent contraction of the wall is required to completely than to partially empty the bladder. As the escape of urine reduces the quantity in the bladder, the muscular force exerted by the partially contracted muscular coat becomes greater until it becomes so great as to press the hypertrophied prostate against it with such force as to completely occlude it, and the urine that remains is unable to escape.

*Self catheterism in many cases is the only treatment required.* This is the author's third proposition which he simply states with the remark that no one would think of advising a patient who is able to obtain relief by catheterism to submit to any radical operation. He then proceeds to his fourth proposition, which is, that

*When the catheter treatment fails or is unavoidable, more radical measures are necessary.* He states his belief that a large proportion of cases treated by catheter sooner or later break down; the urine becomes thick and ammoniacal, the desire to micturate is continuous, the passage of a catheter relieves but for a few minutes, the suffering and discomfort is constant. The greatest care cannot prevent this result in

some cases, and the greatest carelessness does not always induce it. In another class of cases the patient cannot be taught to pass the catheter for themselves and the constant attendance of a surgeon is obviously impracticable.

When radical measures are absolutely necessary, these, to be effectual should

(1) *Drain the bladder thoroughly for a time, and (2) permanently remove the cause of the obstruction.* This is Mr. McGill's fifth proposition. Perineal drainage alone is capable of effecting marked relief. But this relief is only temporary. More radical measures are required to secure permanent relief. The intra-vesical prostatic outgrowth must be removed; if this is done a raw surface will be left in the prostatic region of the bladder, making an additional necessity for efficient drainage. Now follows the sixth and final proposition, viz:

*That these two indications are best fulfilled by a suprapubic rather than by a urethral or perineal operation.* Out of the 24 operated cases at the Leeds Infirmary, only five presented anything resembling a bar and it is doubtful whether in any of them either Mercier's or Bottini's operation could have been practiced with a successful result. Such kind of attempts the author thinks to be unworthy of further trial. The perineal route also, though sometimes practicable is pronounced inferior to the suprapubic for the following reasons: (1) The suprapubic operation is more generally applicable; in only three of twelve cases operated on by Mr. McGill would it have been possible satisfactorily to remove the projecting portions of the prostate by the perineal route. (2) It can be performed with greater precision, and completed with greater certainty. In no way can a bladder be explored with the same completeness as through a suprapubic wound. All projecting portions can be felt with ease, but often are removed with difficulty. (3) It ensures complete and efficient drainage. Drainage takes place more easily through the soft abdominal than through the hard perineal tissue. (4) It is equally safe. This statement is not based on any statistics but merely the personal opinion of the author founded on his own experience. In the twenty-four cases reported, there were four deaths, one due to shock, two due to shock and hæmorrhage, and one to ret-

ropublic suppuration. This last death is the only one properly chargeable to the peculiar method of operation. All the twenty-four patients were old men, with three exceptions above 60, while some were above 70. Almost all were in a bad state of general health, and many were obviously within a few days or weeks of death unless speedily relieved.

The final results secured by the operations at the Leeds Infirmary are frankly stated. In some of the cases calculi were also removed and as the improvement may have been due in some measure to this fact rather than to the operation in the prostate, these cases are excluded. The after history in one of the remaining cases is not known, and two cases are still under treatment. Of the fourteen remaining three died as the direct effect of the operation, and one died after convalescence had become established, from a pneumonia not having any relation to his operation. These leave ten patients to be accounted for. In one the operation was not satisfactorily completed and no relief was obtained. In another case relief for a time was secured, then he relapsed and died ten months after the operation. One, though usually well, is subject to attacks of retention requiring the use of a catheter after excessive drinking. The remaining seven continue well. In six of these cases the prostatic retention had been of long standing, but nevertheless in all of them the bladder has been able to expel its contents since the operation.

The reader will be interested to compare the view of the Leeds surgeons and their results with the investigations of Watson (*ANNALS OF SURGERY*, January, 1889) and the experience of Kummell (*ANNALS OF SURGERY*, December, 1889).

## INDEX OF SURGICAL PROGRESS.

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### GENERAL SURGERY.

**I. Cocaine in the Surgery of the Present.** By Drs. RECLUS and WALL (Paris). However extensive the application of cocaine is to-day, especially in minor surgery, it takes, according to the authors, not by far the position which it deserves as a local anæsthetic. This assertion is supported by the fact that the authors perform not only the minor operations of daily practice, but also have undertaken major operations, as castration, radical operation for herniæ and hydroceles, extirpation of also larger tumors, exarticulations of fingers, irrigation of joints, etc., under cocaine anæsthesia, to their as well as the patients' satisfaction. The explanation of these favorable results lies partially in the manner of the administration of this anæsthetic and perhaps still more in the dosage of the same.

As regards the former, it depends above all upon bringing the most sensitive part, i. e., the skin itself, into contact with the anæsthetic by the injection. This is a very simple fact but is not always sufficiently attended to. In order to do this, one must not inject into the subcutaneous tissue, but must enter the cutis itself, by the greater resistance of which one can convince himself at every moment. If one proceeds slowly in injecting, larger areas of the cutis may be rendered anæsthetic with a relatively small amount of the anæsthetic, without annoying the patient very much. It is well to keep in mind the intended incision during the injection.

Very often this mode of injection will suffice. In case of incisions going more deeply (extirpation of tumors, etc.) it is advisable also to penetrate into the deeper tissues: especially tumors should, as the authors express themselves, be surrounded by a cocaine atmosphere.

In epidermis changed by inflammatory processes, the authors have seen the same favorable results. The injection here should be performed slowly, so that no disagreeable feeling of pressure may be caused, as there exists already a higher degree of tension. One should not puncture an inflamed portion of the skin but proceed gradually toward the focus of the inflammation.

If one desires to have cocaine act upon serous membranes, e. g., in the treatment of hydrocele by iodine injection, it may be injected half an hour before the puncture or after the evacuation of the hydrocele fluid immediately before the injection of the tincture of iodine. In irrigation of the joints at first the skin and the subcutaneous tissue and then through further pushing forward of the canula the surface of the joint is rendered anæsthetic.

The authors also employed cocaine to obtain anæsthesia in stretching of the sphincter ani muscle. They puncture closely to the mucous membrane, deep enough to be sure that they have reached the uppermost fibres of this muscle, and inject in six different places a half-syringeful.

In extraction of ingrown toe-nails the authors had no results with cocaine. In longlasting atypic operations, as extirpation of glands, etc., cocaine is, according to the view of the authors, valueless.

As regards the dose, it depends upon the cases and varies very much. In general a 5% solution (a relatively weak solution) was used; of such up to 5 Pravaz syringeful, i. e. 25cgm., were injected. It may be remarked that the later dose was rarely reached. Nearly always three-fourths of a syringe ful sufficed to produce entire analgesia.

As the authors have never seen, among a large number of cocaine anæsthesias, any serious accidents happen, in spite of relatively large doses having been given, they are, of course, very much inclined to estimate the dangers connected with the application of cocaine, to be very slight.

One has, according to the authors, to take extreme care in injections into vascular regions or directly into the veins; also in the so-called "*injections perdues*," in which after the injection no bloody operation is performed, but as in case of sphincter-stretching, the whole

dose remains in the system. The remedy may also become dangerous in cachectic individuals or in persons suffering from renal affections. That here and there also a case of cocaine idiosyncrasy comes under observation is not denied by the authors; but they think themselves justified in not judging otherwise in regard to this complication in the use of cocaine, as is done in regard to a great number of other remedies which are used by us every day.—*Revue de Chirurgie*, 1889, No. 2.

F. H. PRITCHARD (Boston).

## II. Treatment of Tetanus by Means of Absolute Rest.

By E. DE RENZI (Italy). The author has before made the statement that the best remedy for tetanus is absolute rest of the patient. He has already cured four out of five cases by this method. The tetanus patients were taken into a completely isolated, quiet and darkened room and their ears stopped; the floor of the room was carpeted. All of the manipulations were made, when possible, in the dark; only fluids were given as nutriment and absolute bodily rest was insisted upon. If they suffered from violent pains belladonna and secale cornutum were given internally. He gives the complete history of a case of traumatic tetanus which recovered under this method of treatment.—*Riv. Chir. e Terapeut.*, No. 1, 1889.

A. PICK (Boston).

## HEAD AND NECK.

### I. Case of Successful Removal of Cerebral Tumor. By

RUSHTON PARKER, F.R.C.S. (Liverpool). Robust male, æt. 38 years. Long standing headaches, mental dullness, total paralysis of left arm, paresis of left leg. No optic neuritis. In addition to the ordinary method of localizing the Rolandic line, a puffy swelling of the scalp in front of the right parietal eminence was accepted as indicating the site of the deeper lesion. Situated in the region which must have been chosen, it was accepted as the guide, exposed in the middle of the flap turned down, and found to consist of pericranium, thickened and softened though retaining its textural continuity, and at the end of the operation was dissected away. The skull was opened with a one and-a-half

inch trephine, and a rounded tumor the size of a walnut, with a bit of adherent dura mater, was shelled out by breaking through the surrounding brain with the fingers. The flap was attached with very few sutures, and held down by antiseptic padding and a close bandage. In consequence of the rather profuse discharge of serum on the third day, drainage tubes were then introduced. There later followed pulsation over the hole and suppuration in their track, with increasing uneasiness and a return of paralysis that had almost gone, until by the nineteenth day matters were truly critical. Then, under chloroform, the almost healed flap was turned down again, and found, in the main, healthily united to the brain beneath. This, however, being œdematous and prominent, was sliced off level with the bone, revealing sinuses lined with puriform lymph, which was scraped away and the wound packed. No more bad symptoms of any kind were met with again, and the patient's immediate safety became quickly established. A large fungus, however, resulted, and showed no disposition to subside spontaneously, but was reduced by force on the thirty-second day, and the skin-flap laid down on it, and kept down by a plug of coins folded up in antiseptic gauze under a sheet of tin plate. Six days later the fungus was replaced by a chasm lined with granulating brain. Eventually satisfactory healing occurred, with gradual restoration of the patient's strength, which had become much reduced before the second operation, and remained low while the fungus lasted.

Total paralysis of the arm and much of the leg followed each operation, and lasted a day on the first, but ten days on the second occasion. Gradual improvement in this respect has continued up to the present time. He sat up daily after the thirty-sixth day, but was not soundly healed till the eightieth, by which time he could walk by himself in rather a staggering way. With the arm he was then still rather lame, and could not find or seize objects while his eyes were shut, or distinguish, for instance, a tall hat from a spectacle-case when holding them; but all this slowly improved, and at the end of five months he could turn over the leaves of a book singly pretty well when his eyes were open, though fumbling a good deal when his eyes were shut.

A great benefit owned by him is the total loss of headaches and the



dazed feeling and manner that preceded operation. He expresses himself as quite restored to mental vigor and comfort. All traces of paralysis have long left the face, while the strength of the affected limbs has improved with each month, and the tactile discrimination and muscular sense of the arm are now completely restored. The operator believes the growth to have been a gumma.—*Brit. Med. Jour.*, 1889, November 30.

## II. Cortical Epilepsy Following Penetrating Wound of Skull Relieved by Trephining One Year After Injury.

By DR. A. KOEHLER (Berlin). A man, æt. 33 years, received on May 5, 1888, a sword cut on left parietal bone, producing a 10 cm. long wound in the bone, without any depression, and followed by paralysis of right arm and right side of mouth, and some disturbance of speech. On the 4th day the tongue when protruded deviated strongly to the right. During the first 5 days after injury there were twitchings in the paralyzed muscles.

The wound healed perfectly. When the patient was discharged on July 6, 1888, the right hand was still weak and the apposition of the thumb was difficult. No disturbance of speech, but the tongue still deviated to the right. Five weeks after his discharge from the hospital the patient had a first attack of epilepsy, 6 weeks later a second, and since then one every 4 weeks. The attacks were characterized by twitchings in the hand, arm, neck, face and leg on the right side, often accompanied by loss of consciousness, and twitchings extending over to the left side of the body but beginning in the inverse order, and ending with general convulsions.

The weakness of the right hand and arm as well as the disturbance of speech increased after each convulsion.

Patient was readmitted to hospital on May 22, 1889. On June 7, 1889, trepanation was undertaken. The scar on the scalp was very fine and adherent to the bone. At the place where the scar was supposed to cross the fissure of Rolando there was slight tenderness on pressure. The scar in the bone when exposed was small and not depressed. In its center a small opening into the skull was made with a

chisel; the bone at this place was scarcely 6 mm. thick. On enlarging this opening the dura was found adherent, the bone much thickened and covered with several thorn-like processes protruding into but not perforating the dura. To this enostosis several pieces of the vitreous table were adherent and had pushed the dura deeply in one of the fissures. Chiseling away of the bone was kept up until non-thickened bone and non-adherent dura was found. The opening resulting was oval in shape, its longest diameter being 4 cms., and its shortest 3 cms.

The exposed dura was reddened, felt rough and pulsated markedly.

The wound was thoroughly irrigated with bichloride and tamponed with iodoform gauze and the skin sewn up except at the center of the wound.

The operation and the dressing of the wound together lasted two hours.

The wound where sewn healed by first intention, the open point closed in 3 weeks.

The first tampon was left in place for 2 days and then removed because twitchings took place several times in the muscles of the right arm and shoulder, but no loss of consciousness occurred. The 2d tampon was loosely applied, and up to the time of writing, 4 months since the operation, there has been no return of the symptoms.

Two weeks after the trepanation the patient could hardly hold a pen and his writing resembled that of a paralytic. Three months afterward the patient could write quite well.

From time to time he experiences slight fibrillary contractions of the interossei muscles.

There is still a slight slowness of speech and a slight deviation of the point of the tongue to the right.—*Deutsche Med. Woch.*, No. 46, 1889.

F. C. HUSSON (New York).

**III. Resection of the Third Branch of the Trifacial Nerve at the Foramen Ovale.** By DR. SALZE. The lower posterior edge of the body of the malar bone is marked out and the lower edge of the zygomatic process of the temporal bone, about a finger's breadth in front of the tragus. Between these points, with a strong scalpel or re-

section knife, an arched incision, curving upward, is made, the highest point of which is about a finger's breadth over the malar bone. The knife at once penetrates skin, temporal fascia, muscle, and the periosteum of both roots of the malar bone. After arresting hæmorrhage from the twigs of the deep temporal artery, the place at which the zygomatic process joins the tuberculum mandibula is freed, with a narrow elevator, in order that the bone can be separated by a pointed narrow saw immediately in front of the articulation of the jaw. The anterior edge of the malar bone is then sawed through. In order to sufficiently displace downward the soft parts and flap containing the malar bone, it is necessary to separate from the skull the still intact insertions of the temporal muscles. This is best accomplished by means of the resection knife, immediately upon the bone. Having arrived at the crista temporalis, the parts are cleaved with a blunt instrument (an elevator) from the base of the skull, in order that in the depths of the funnel-shaped wound, injury to the joint or sharp hæmorrhage does not occur. By keeping continually to that portion of the wound which is bounded from above by the base of the skull, and from behind by the articulation of the jaw, the operator cannot fail to find the place of exit of the third branch. In a favorable light, with the soft parts of the flap and the upper edge of the pterygoid muscle well retracted downward, the nerve may be freed so far as to identify the separate portions of the same. A slight opening of the patient's mouth renders this easier. Hæmorrhage should be arrested by plugging the wound.

Finally, a probe pointed tenotome with a concave cutting edge, the blade directed forward, is pushed along the base of the skull, between the middle meningeal artery and nerve, in order to divide the nerve from behind, immediately at the foramen ovale. The resection of the peripheral extremity of the nerve is done with an angular forceps (ear forceps) and curved scissors.

The way along the base of the skull and the capsule of the articulation of the jaw can be so easily recognized that the bearings in the deep wound are recognizable through a relatively small incision. Second, the incision leaves but a slightly deforming cicatrix. Third, by this incision only the frontal branches of the seventh nerve are in-

jured, whose division cannot cause disturbance of essential function. Even the oricularis palpabræ retains its function, probably by means of deeper lying branches of supply, and not, as the author claims, because of primary union of the nerve fibres. (See Albrecht's experiments and observations). Fourth the division of the other parts of the wound at the cross-division of the temporal muscle is quite without importance. Fifth, no troublesome hæmorrhage is to be expected.—*Arch. f. klin. Chirg.*, bd. 37, hft. 3.

**IV. Resection of Third Division of the Trifacial Nerve at the Foramen Ovale.** By DR. ULLMANN. The patient is placed so as to bring the head somewhat depending, and turned in the direction opposite to the side to be operated upon. A curved incision is made, beginning about  $1\frac{1}{2}$  cm. above the angle of the jaw, and passing upward, crossing the facial artery above, terminating upon the edge of the lower jaw, with its curved portion lying just behind the latter. The cervical branches of the seventh are the only ones divided in this incision. The lower portion of the parotid gland is then loosened and separated from the parotido-masseteric fascia, and the former retracted.

The external pterygoid muscle is separated by means of scissors from its attachments at the angle of the jaw. The nerve is now brought into view. The lingual nerve is also seen posteriorly, and may be to some extent isolated. By means of an aneurism needle a ligature is passed around the inferior maxillary nerve, and tied at its peripheral portion. The nerve is then separated at the dental foramen, and now serves as a guide in reaching the foramen ovale. If it is cleared from its surroundings, drawn in a vertical direction and its course followed, it will be found to take a direction slantingly upwards and towards the median line. The divided mylo-hyoid branch of the inferior dental will be seen to be given off at this point. The loose tissues around the lingual nerve being isolated, the trunk of the latter is found passing toward the inferior maxillary nerve as it is held upward; the distinctly visible chorda tympani may be distinguished passing from the lingual below the inferior maxillary nerve.

The middle meningeal artery lies in its relation laterally to the inferior maxillary nerve, and is separated from the same by loose connective tissue. In this tissue are the two roots of the auriculo-temporal nerve, which surrounds the meningeal artery.

By dividing the lingual nerve on the cerebral side of the chorda tympani, and holding the inferior maxillary nerve in a downward direction, the foramen ovale, with its contents, is found to be easily accessible.

In individuals with a strongly prominent angle of the jaw, this latter may be temporarily or completely resected.—*Wiener klin. Wochenschrift*, 1889, No. 25.

**V. Cancer of the Tongue.** By DR. KRAUSE (Halle). During the period of time extending from 1875 to 1888, 91 cases of carcinoma of the tongue were operated upon at v. Volkmann's Clinic. Of these, 2 died following the operation, these being cases of complete extirpation, of which latter there were 35 in all. The average duration of life following the operation in these last named cases was 12 months; but one was absolutely free from recurrence after a lapse of 6 years. Of the 56 cases of partial extirpations, 7 were found to be free from recurrence after the same lapse of time; the most rapid recurrence in this class took place in 8 months. The microscopic diagnosis was established in all cases.

v. Volkmann, after trial of the submental method of operating, abandoned the same. He likewise rejects preliminary ligature of the lingual vessels as well as tracheotomy. In the relatively easy cases, the tongue is brought well forward and hæmorrhage is arrested in the wound; in more difficult cases, v. Langenbeck's method of temporary section of the lower jaw, with division of the palate-glossal arch, is adopted. A drainage tube is placed in the recess of the tonsil. Cases involving the epiglottis are rejected.—*Deutsche Med. Wochenschrift*, 1889, No. 22.

G. R. FOWLER (Brooklyn.)

**VI. On Extirpation of Goitre in Graves' Disease.** By R. STIERLIN (Zurich). The few cases in which this operation had

been done showed that it had a curative effect on the main disease. For other forms of goitre strumectomy finds its only indication in dyspnoea, but here it may be warranted in the absence of respiratory interference. Tillaux (1880) first reported a cure by this means. In 1884, Rehn published 3 cases, with more or less definite symptoms of Graves' disease, that were relieved or cured by this operation. (Rehn's fourth case is excluded by Stierlin.) Bénard (1884) reported 2 cases, Josipovici and Wolff (1887) 2 cases, Przebicky and Mikulicz (1888) 1 case and Kocher several, as yet unpublished in detail. The results in these cases were very encouraging. Including his own Stierlin counts 12 known cases.

His case was that of a seamstress, æt. 19 years. The mother in her youth had suffered from goitre, but been cured by external applications. A brother also had a goitre. With the patient this first appeared 5 years previously, and cardiac symptoms 3 months. The eyes were in every way free. He considers the case probably one of incipient Graves' disease.

Typical extirpation of the goitre by Professor Krönlein. The rapid and increased heart-action then gradually returned to normal (from 120-130 to 60-90). The previous dirotic pulse became katacrotic. A slight dilatation of the left ventricle disappeared. The nervous restlessness largely subsided.

For comparison he took pulse curves of patients affected with simple goitre, before and after operation, and found that in such no alteration was produced.

He was unable to make out from these successful operations in exophthalmic goitre any argument for or against the theory of its sympathetic origin.—*Bruns' Beiträge zur klin. Chirg.*, 1889, bd. v, hft. i.

WM BROWNING (Brooklyn).

**VII. Scirrhus of the Thyroid.** By T. BILLROTH (Vienna) Billroth has operated upon cases of females, æt. 26 and 46 years respectively. In the first case, the tumor, the size of a horse chestnut, was laid bare by an incision along the anterior edge of the sternocleido-mastoid muscle, between the carotid, nerve, œsophagus and lar-

ynx. The suprathyroid artery was tied, believing that he had to deal with a disease of the thyroid; but it was finally decided that the knotty induration extended deeply beneath the sternum, and Billroth decided that further attempts at extirpation were not justified. Four months later the conditions were found to be considerably worse. In the second case the operation was still more difficult, and was followed by an unfortunate result. In this case a knotty induration existed upon the left side, corresponding to that lobe of the thyroid. Only the smallest œsophageal sound could be introduced, and that with great pain. Hoarseness and paralysis of the left vocal cord existed, and the trachea was narrowed in two places. During the operation both œsophagus and trachea were torn, and a canula placed therein, and complete extirpation was successfully accomplished. The patient perished, probably from hæmorrhage, in a few minutes after leaving the table. A small opening was found in the innominate vein, which, however, did not bleed at the time of operation, probably for the reason that it was strongly dragged upon in an upward direction. Billroth calls attention to the exceedingly unfavorable diagnosis of the disease. Diagnosis of this condition of the thyroid is somewhat difficult and the prognosis most unfavorable. Prominent symptoms are, induration of the thyroid, accompanied by radiating pains, and difficulty of breathing and swallowing.—*Wein. Med. Woch.*, 1888, No. 20.

G. R. FOWLER (Brooklyn).

**VIII. On Cartilaginous Growths of the Larynx.** By Dr. FERUCIO PUTELLI (Venice). The patient, a goldsmith. æt. 50 years, was several times the object of a medical examination on account of a mitral insufficiency. The hoarseness which then also was present was ascribed to his continual use of the blow-pipe, and as independent of the heart disease. Upon post-mortem examination there was found with moderate œdema of the glottis, a pale red tumor lying beneath the vocal cords. The hardened preparation showed that to the cricoid cartilage was attached a half globular tumor, arched somewhat backward, but especially forward, somewhat rough on the surface, yet very hard and not displaceable. The mucous membrane covering it

was very tense and thin. The entire lower laryngeal space was closed except about a 3 mm. slit. This tumor, about 26 mm. thick and 23 mm. long, consisted of cartilage, which appeared centrally soft and sprinkled with bluish-white; peripherally there appeared normal hyaline cartilage. The vocal cords and joints presented no abnormalities.

The *histological examination* yielded hyaline cartilaginous tissue with very rich basis substance. The tumor contrasted strongly with rest of the cartilaginous tissue, as the normal cartilage showed much less basis substance and a regular disposition of fine cartilage cells. At the anterior periphery of the tumor there were small calcified spots, superficially situated, and sometimes small osseous lamellæ. The arrangement of the tissue makes it seem probable that the enchondroma originated centrally in the cricoid cartilage and growing forward caused the cricoid cartilage to nearly disappear.

The literature which Putelli passes critically in review produces only 8 cases of true *enchondroma* (as a contrary to the *enchondroses*), the cases of Froriep, Türck, Billroth, Musser, Bertoyer, Boecker, Birch-Hirschfeld, Putelli). Of these 3 were diagnosed only in the cadaver, the others as tumors *intra vitam*, but only as enchondromas in Billroth's cases where there was a piece of the tumor coughed up.

The etiology of this disease, seen indeed only in males between the ages of 38 and 62, and *prognostically* unfavorable, is obscure.

Its *seat* is nearly always the cricoid cartilage plate; its size varies between that of an almond on to a walnut.

The *symptoms*, dependent of course upon the seat and extent of the tumor, are referred to the changes in the voice, the respiration and the act of swallowing.

The *diagnosis* is "always very difficult," as the growth rarely appears. One should call to mind, 1, the long duration; 2, the slow progression; 3, the presence of a very consistent tumor, covered by the mucous membrane, smooth, round and situate between the surface of the cartilage, unaccompanied by any glandular swellings or changes in the larynx. Inflammatory symptoms are absent, hence one may exclude *perichondritis*.

As to the *treatment* of the tumor it can never be eradicated endo-



laryngeally not even by means of the galvano cautery, by means of which new dangers could easily be brought forward, as perichondritis, necrosis.

The removal of the tumor can only be done extralaryngeally. The method of operation is different, according to the seat of the tumor. If its site be in the plate of the cricoid cartilage, then a partial excision of the cricoid cartilage is rendered difficult, as 1, the tumor, even if it is seated upon the side of the cartilage, is never confined to the one side of the cartilage but sometimes arises from the center; 2, the tumor sometimes not only is confined to the larynx but also may extend into the pharynx, where the anterior pharyngeal wall would not be spared. Billroth "enucleates" the tumor from the neck by means of subhyoid pharyngotomy, but he soon observed a recurrence. Boecker removed the tumor by tracheo-laryngotomy, with the entire cricoid cartilage, leaving the arytenoid cartilage and the vocal cords. Putelli recommends this method of operation; after which the patient (5 weeks after) left the hospital, and with a tracheal canula, with but little trouble in breathing and phonation — *Wein. Med. Jahrb.*, *N. F.*, III, 7, p. 351, 1889.

F. H. PRITCHARD (Boston).

## CHEST AND ABDOMEN.

### I. A New Method of Operating for Thoracic Empyema.

By Dr. M. SSUBBOTIN. In cases of long standing empyema, in which plastic measures for securing obliteration of the pleural cavity by collapse of the chest walls are indicated, the author successfully performed the following operation: A portion of the 7th rib (6 to 8 ctm.) is resected in the usual manner, and the pleural cavity is opened and thoroughly irrigated. This opening is packed in order to prevent septic infection. A longitudinal incision is now made upon the external edge of the pectoralis major muscle, of about 5 ctm. in length, by means of which latter the author bares the 6th, 5th and 4th ribs. Without removing the periosteum, from each of these ribs a small wedge is resected, so that the rib becomes movable at this point. A similar longitudinal incision is now made in the posterior axillary line, and at

this point the above mentioned ribs are treated in a similar manner. These vertical incisions have no connection with the pleural cavity, and are sutured at once, without damage. The portion of the chest wall lying between the longitudinal incisions now sinks in, and, as the healing process advances, becomes fixed in this depressed position, serving the double purpose of protecting the chest cavity and preventing, in some measure, the scoliosis which occurs so commonly after operations for empyema.—*Vratch*, 1888, No. 45.

G. R. FOWLER (Brooklyn).

**II. Operation for Relief of Congenital Diaphragmatic Hernia.** By DR. J. O'DWYER, of New York. A child, æt.  $3\frac{1}{2}$  years, had symptoms supposed to indicate extensive empyema of left side, for the relief of which an opening was made in the 6th intercostal space. The escape of a loop of small intestine through this opening showed the real nature of the case. The intestine was returned and the wound closed. On the next day Dr. O'Dwyer proceeded to operate for the relief of the diaphragmatic hernia. He made an incision about two inches long in the tenth interspace, and found an aperture situated in the muscular portion of the diaphragm, about one inch and a half in diameter, the external margin reaching close to the ribs. He then removed about three inches of the 9th and 10th ribs, and by drawing down the floating ribs, ample room to insert the whole hand, if necessary, was obtained. Considerable difficulty was experienced in replacing the intestines, owing to the small size of the peritoneal cavity, from retraction of the abdominal muscles. The cæcum and some of the omentum were the last parts reduced. To prevent a return of the intestines while paring the edges of the wound and passing the sutures, two flat sponges, attached to holders, were found necessary. Strong braided silk was used for this purpose, and six sutures inserted. When the diaphragm was allowed to resume its position, after the completion of the operation, the pressure from below was so great that it bulged upward, so as to fill at least half the pleural cavity. The hernia being probably congenital, and the whole mass of intestine, with the exception of the descending colon, having occupied the

chest so long, there was not sufficient room for them in the abdominal cavity.

An attempt was made to relieve the great strain on the sutures by packing in some antiseptic gauze and closing the external wound around it, but without avail.

Death occurred rather suddenly six hours after the operation, at the very time that he appeared to be doing well.

At the autopsy the edges of the wound in the diaphragm were found somewhat separated, and in all probability the sutures would have cut completely through in twenty-four hours had the patient lived so long. —*Archives of Pediatrics*, December, 1889.

**III. Laparotomy in Tubercular Peritonitis.** By PROF. H. LOEHLEIN (Giessen). The writer says that most of the cases reported have occurred in women and have, for the greater part, been diagnosed as abdominal tumors. The important point of how often, in the female, tubercular peritonitis is a primary disease, and how often it is secondary to tuberculosis of the genital tract is as yet far from settled. Of the six cases which Löhlein has seen, in only two could the uterine appendages be said to have been the starting point of the trouble.

Two of the writer's cases occurred in ante-bacteriological time.

No. 1. Woman, æt. 28 years, with an encapsulated collection of fluid and numerous tubercles of the peritoneum, was operated on in Martin's clinic in 1874 for what was diagnosed at the time as an ovarian cyst. The same for the second case.

In the first case the patient recovered perfectly from the operation, and remained in perfect health for several years. The second case, which occurred in 1880, was in a woman, æt. 40 years. The disease began, undoubtedly, in the uterine appendages. After several months of perfect health the ascites returned, and the patient died fifteen months after the operation with all the symptoms of tubercular enteritis. The other four cases seen by Löhlein occurred within the past two years.

In Case No. 3, Hofmeier made an exploratory laparotomy in a woman, æt. 43 years, on account of ascites and an irregular, hard

swelling in Douglas' pouch, his diagnosis being malignant affection of the peritoneum. He found tubercles of varying size all over the peritoneum, and both tubes completely enveloped by these masses. Bacilli were found in some of the excised tubercles. Four weeks after the operation the ascites returned, and in two months it was as marked as before.

Case 4. Woman, *æt.* 23 years, twice pregnant, abdominal tumor of six months' growth, resembling a cyst with loose walls. Laparotomy July 27, 1888. Tubercular eruption on peritoneum, most marked in Douglas' pouch; examination of the removed viscus showed bacilli. She did well after the operation, and in December no ascites could be made out, though there was an exudation of serum through one of the suture canals. In March, 1889, she returned with marked ascites. Lungs perfectly well. Laparotomy was again undertaken, and an excised piece of the thickened peritoneum showed histological tubercles but no bacilli. A marked deposit of tubercles existed around the tubes and ovaries. The patient was discharged on April 14, and at the end of May the patient feels well, but the ascites is returning, notwithstanding a copious exudation of serum through the suture points.

Cases 5 and 6, both young girls, *æt.* 15 and 17 years, neither having a family history of tuberculosis. Lungs in both apparently perfectly healthy. Both came to the clinic on account of the rapid growth and distention of the abdomen. In case No. 5 the intestines are matted together and drawn toward the spinal column and the sharply encysted fluid spoke in favor of ovarian tumor. The case is interesting on account of the severe fever which followed the operation, though the most rigorous antiseptic precautions had been observed in evacuating the ascitic fluid. Symptoms of suppurative peritonitis soon followed the operation and these were complicated by pleuritic trouble. The wound was several times enlarged, drained and washed out, but some remittent febrile symptoms have remained, together with a slight discharge of pus from the lower angle of the wound.

The histological structure of some of the removed pieces of peritoneum was that of tubercle, but no bacilli were found.

In the 6th case the parietal visceral peritoneum was thickly covered with kernels of varying size, and the mesentery was drawn up in a hard ball, and the intestines were drawn toward the right hypochondrium. After the removal of  $2\frac{1}{2}$  litres of greenish fluid the circumference of the abdomen was hardly diminished. The wound healed perfectly, and the patient is yet in the hospital.—*Deutsche Med. Wochen.*, No. 32, 1889.

F. C. HUSSEX (New York).

**IV. Contributions to the Surgery of the Liver.** By DR. C. GARRE (Tübingen). This is practically the description and discussion of four operated cases. Hesitation in operating on the liver has been due not simply to the danger of sepsis but also to the fear of hæmorrhage and intraperitoneal effusion of gall. Edler (*v. ANNALS*, November, 1887) has shown that traumatic injuries of this organ are not so fatal as commonly supposed.

I. *Extirpation of an Echinococcus of the Liver by Resection of a Portion of the Right Lobe.* This patient was an otherwise healthy woman. æt. 44 years. Of the abdominal tumor it could only be made out with certainty that it was not connected with the genital organs. Exploratory laparotomy. The tumor was found to be attached to the quadrate lobe of the liver by a thin hand-wide pedicle. Otherwise there was only a slight adhesion to the omentum. The pedicle was doubly tied in several portions and touched with the thermocautery at the thickest part. The ligatures (of silk) frequently tore the tender liver-tissue; the resulting hæmorrhage was controlled by compression with sponges. Thus there was left a gaping liver wound 10 or 12 by 3 cm. in size. This was disinfected further with sublimated sponges and the abdominal wound closed. The tumor proved to be a living echinococcus covered by a thin though variable layer of liver-parenchyma. Further course uninterrupted was allowed to get up at the end of 2 weeks, and was discharged 5 days later.

An exactly similar operation Garré was unable to find recorded, still it was only going a step further than in the method of late introduced by the French school (Terrier and others).

II. *Shot-Wound of the Liver Removal of a Prolapsed Portion of the Liver. Cure.* This was furnished by Bruns from the Franco-Prussian war. A soldier received a chassepot-ball in the right axillary line. A nut-sized piece of liver in the exit opening, about in the middle line, was immediately removed. Uninterrupted cure, so that the man was able to resume his duties in 2 months.

III. *Excision of a Cancerous Nodule from the Liver. Recovery.* A man, æt. 50 years. Greatly debilitated. Tumor in abdomen for 6 months. Exploratory laparotomy. Tumor of uncertain origin, though extensively adherent to the parietal peritoneum. In the border of the right lobe of the liver, beside the incisura hepatis, was a yellowish pea-sized nodule. A hazelnut-sized piece of liver tissue enclosing the nodule was excised with the knife and the wound seared with the thermocautery. This proved to be a metastatic cancer-nodule, hence removal of the main tumor was not undertaken but the abdominal wound closed. No mishaps.

The recent operations of Langenbuch, Thornton, Tait and Burckhardt directly in the liver substance are briefly mentioned. Recent experiments by Jenny in Socin's laboratory have shown that no bacteria develop from inoculating nutritive gelatine with bile. Similar evidence was furnished by Uhde's case of rupture of a gall-duct ending in recovery. Hence Garré concludes that we can dispense with drainage in wounds of the liver when antiseptic.

IV. *Tropical Liver-Abscess. Cure by Puncture.* This case was from the practice of Socin in Basle, a man, æt. 36 years, who had lived in Sumatra, but did not develop his trouble until his return to Europe. In aspirated pus no bacteria were to be found, nor were various cultures and animal experiments otherwise than negative. Since the observation was made, however, Kartulis has shown that the abscess-membrane yields the amoeba of dysentery or other microorganisms in most cases. Twice punctured with large trocar, and drained for some days with boric and iodoform injections.--*Brun's Beiträge f. klin. Chirg.*, 1888 bd. iv, hft. i.

**V. Contributions to the Surgery of the Gall-Bladder.** By DR. K. KLINGEL (Heidelberg-Weisloch). Of this article 15 of the 28 pages are devoted to the history of operations on the biliary passages, and a review of previous cases. He mentions Marion Sims as the founder of modern cholecystotomy (1878). Extirpation of the gall-bladder (cholecystectomy) was introduced by Langenbuch (1882). Winiwarter (1880) attempted to form a fistula between gall-bladder and small intestine, whilst Kappeler (1887) was the first to perform a one-act cholecystenterostomy.

Four new cases from the Heidelberg clinic are then given, one of cholecystectomy and three of cholecystotomy.

1. Woman, æt. 32 years. Impaction of gall-stones in cystic duct, empyema of gall-bladder, circumscribed purulent peritonitis. Cholecystotomy. Death next day. It was doubtful whether the operation had hastened the fatal termination.

2. Woman, æt. 42 years. Exploratory aspiration of 10 cm. pus. Cholecystectomy for empyema and pericystitis (of gall-bladder.) Vast number of small calculi, estimated at 1000, a couple being impacted in the duct. Paravesical abscess. Primary union of wound and general improvement for a time. Then rapid development of embolic thrombosis of pulmonary artery, and death 19 days p. o. The autopsy showed an encapsulated abscess containing bilious pus, at about the seat of the extirpated viscus. This did not communicate with the stump of the cystic duct. There were extensive adhesions of surrounding parts.

3. Woman, æt. 49 years. Here an operable cancer had been diagnosed, but the operation disclosed the tumor to be the gall-bladder tensely filled with concretions. Cholecystotomy. Suture of bladder to abdominal wound. First change of dressing on ninth day, removal of skin sutures. Second change seven days later, removal of the deeper sutures. Further course uniform. Cure. The previously present dilatation of the stomach and allied symptoms leading to the diagnosis of cancer disappeared. In a foot note Czerny states that he operated another case successfully according to this method in February, 1889.

4. Woman, æt. 50 years. Angiosarcoma of the gall-bladder, with gall-stones. Incision. Discharge of pus and calculi. Material obtained by scraping out the cavity showed the nature of the primary trouble. Later a marked tumor developed but its removal was not permitted.

He gives the indications for operations on the biliary passages briefly as follows: 1, cholelithiasis; 2, dropsy and empyema of the gall-bladder; 3, closure of the choledochic duct; 4, wounds of the gall-bladder. To these tumors of the bladder might be added, only that benignant can scarcely be diagnosticated *intra vitam*, and malignant run such a rapid course that their operation is rarely possible. Furthermore he takes the ground that though this bladder is perhaps not very necessary, still on general principles it should only be removed for due cause.—*Brun's Beiträge f. klin. Chirg.*, 1889, bd. v, hft. i.

WILLIAM BROWNING (Brooklyn).

**VI. Effects of Extirpation of the Gall-Bladder.** By D. R. Oddi (Bologna). Oddi extirpated the gall-bladder in three large dogs, and following the operation found gall pigment in the urine, the voided stools of a fluid character, deeply colored and mixed with mucus; in the meanwhile the animal, despite a great voracity, becoming greatly reduced. After from one and a half months, the pigment begins to disappear, the fœcal matter becomes less fluid, the voracity decreases and the general condition is improved. These phenomena are explained by Oddi by the fact that there occurs a continuous flow of bile into the intestine, the coloring matter of which is absorbed, while the constant presence of the bile in contact with the mucous membrane produces a catarrhal condition of the same. In addition to this, through a diminution of the bile, at the point where the chyme enters the duodenum, the emulsifying process of fatty matters, and, consequently, the whole digestive function, as well, are interfered with. This explanation is supported by the fact that in a control animal, in which Oddi established a gastro-biliary fistula, with ligature of the ductus choledochus, the operation was followed by the appearance of of copious gall pigment in the urine but by neither diarrhœa nor decrease



in weight; on the contrary, on account of the heightened voracity, the animal's weight was considerably increased. This was thought to be due to the fact that the bile accumulated in the stomach, and was emptied, together with the chyme, into the duodenum. It is interesting to note the fact that a considerable increase in the size of all the bile ducts occurred. This was most marked in a dog, killed after one month, while in the others, killed two or three months afterwards, the hepatic ducts were slightly enlarged; the cystic duct, however, being enlarged in a ball-shaped manner, which suggested an attempt on the part of nature to form a new gall-bladder. Oddi convinced himself of the existence of a sphincter of the ductus choledochus, and interprets the behavior of the animals during life, and the condition of the bile ducts found after death, as a result of the action of the sphincter which converts the flow of the bile from a continuous flow to that approaching the normal.—*Ceutbl. f. Chir.*, 1889, No. 8.

GEO. R. FOWLER (Brooklyn).

## VII. The Surgical Treatment of Tubercular Peritonitis.

By DR. F. SPAETH. Spaeth asserts that, in the vast majority of reported cases of so-called tubercular peritonitis reported, as cured by abdominal incision and drainage, the proof of the existence of a true tuberculous affection, *i. e.*, the demonstration of the presence of Koch's bacillus, is wanting. He disapproves of the operation, basing his views upon an unfavorable experience in indubitable cases.

His conclusions are as follows: 1. In primary peritoneal tuberculosis, other organs being not affected, the operation of laparotomy may be entertained or even recommended as a remedy. 2. In peritoneal tuberculosis, with coexisting affection of the female genital organs, the operative procedure has not been followed by encouraging results; the same remark applies as well to cases in which the diseased organs have been removed. 3. In tubercular peritonitis arising from a tuberculous disease of the intestinal tract, a palliative effect is likewise only to be expected. 4. In cases of tuberculosis of the genitals without peritoneal tuberculosis, a very early operative procedure is frequently successful. The indications, in this class of cases, are difficult to appreciate on ac-

count of the rare possibility of an accurate bacteriological diagnosis being previously made. 5. Primary bacillary peritoneal tuberculosis is a much rarer disease than heretofore supposed. The diagnosis is therefore to be accepted only when a bacteriological foundation exists for its support.—*Deutsche Med. Wochenschrift*, 1889, No. 20.

**VIII. Colorectostomy.** By DR. E. ULLMAN. The miserable condition of patients suffering from inoperable carcinoma of the rectum, particularly those who, with the view of prolonging life, submit to the operation of colotomy, are set forth. The location of the disease high up, in itself constituting a contraindication to excision of the rectum, forms an indication, in the opinion of the author, for the establishing of an anastomosis between that portion of the bowel situated above the tumor and the portion lying immediately below the stricture (colorectostomy). By this means the portion of the bowel the site of the disease is removed from the track of the fæcal discharges. This procedure does not present, according to the author, a greater danger than colotomy, and extirpation of the disease is not entirely abandoned. Upon opening the peritoneal cavity, it may be found that a radical operation is possible in a given case; on the other hand, this proposal may be held in reserve as an alternative procedure.—*Wiener Med. Presse.*, 1889, No. 24.

G. R. FOWLER (Brooklyn).

**IX. Appendicitis.** By C. MCBURNEY, M.D. (New York). One cannot with accuracy determine the extent and severity of the disease from the symptoms. Pain to a greater or less extent is present in all cases. General abdominal pain is often all that the patient will complain of during the first few hours of the attack, but later it becomes more and more evident that the chief seat of pain is in the iliac fossa. The epigastric region is frequently the point first complained of. In every case the seat of greatest pain, determined by the pressure of one finger, has been very exactly between an inch and a half and two inches from the anterior superior spinous process of the ilium in a straight line drawn from that process to the umbilicus. Fever to some extent

is present in all cases, differing greatly in degree. Rigidity in abdominal muscles, much more marked on the affected side, is constant and a sign of value. Abdominal distension by tympanites varies greatly, may be entirely absent in the worst form of sudden perforation. Tumors, of greater or less size, may usually be detected at a very early stage. The combination of symptoms present usually renders a correct diagnosis as to the seat of the disease easy, but in reference to the stage which the disease has reached—that is, whether pus has formed or not, whether the appendix is already perforated or not, even sometimes whether already general septic peritonitis exists or not—the diagnosis is often very doubtful. In the early stage no accurate diagnosis can be made as to whether the appendix is perforated or not, excepting in those cases in which comparatively mild symptoms suddenly become much aggravated, where perforation or the rupture of an abscess may be inferred. A further aid to diagnosis is needed, positive and rapid. The author sees no clearer road than exploratory laparotomy permitting direct inspection of parts. Acting upon this conviction, he has already done early exploratory incision in eleven cases, in all of which serious disease of the appendix was revealed justifying its excision. One death followed the operation, probably from intestinal obstruction by a band not discovered. In every case operation was done as soon as possible after it was seen, except in the fatal case, where a delay of twelve hours was indulged for various reasons.

As contraindications to early operation, the author presents very great abdominal distension, unusual obesity, and, most important of all, the absence of any of the necessary safeguards and aids, such as skilled assistants, good light and the requisite appliances for aseptic work—*New York Medical Journal*, 1889, December 21.

**X. A Case of Cholecystenterostomy.** By MR. A. W. MAYO ROBSON (Leeds). The patient, a married woman, had had abdominal section performed in April, 1887, for pelvic distress, on account of which she had been a confirmed invalid for several years. After the operation, in which a right pyosalpinx was removed, she had been able to resume her work, and had enjoyed excellent health. On January

9, 1888, she was readmitted to the infirmary suffering from acute peritonitis, with a tumor in the region of the gall bladder. On January 14 laparotomy was performed through the upper part of the right linea semilunaris, and eight ounces of foetid pus removed from the gall bladder. Exploration of the ducts by finger and probe failed to discover any gall stones. The gall bladder was stitched to the abdominal wound and drained, and the patient made a good recovery, with the exception of having a biliary fistula. Although she retained good health during the fifteen months when the fistula was open and discharging the whole of the bile, her condition was a very miserable one, since no apparatus could be satisfactorily made to catch the overflowing fluid when she was walking about, and her dressings and clothes soon became saturated. On March 2, 1889, cholecystenterostomy was performed by reopening the abdomen through the old cicatrix in the right linea semilunaris. The viscera in the neighborhood were found to be so matted together that it seemed to be impossible to fix the gall bladder to the duodenum, and as the hepatic flexure of the colon was conveniently near, the gall bladder was fixed to it by a double row of chromicised catgut sutures, a free communication being made between the two viscera, and the outer opening (the old fistula) of the gall bladder was stitched up. In order to guard against accident a glass drainage tube was placed in the right kidney pouch, and brought out at the lower end of the wound. The outer surface of the gall bladder evidently gave way to some extent, for bile appeared through the drainage tube within a few days of the operation, followed shortly by a fæcal discharge. The wound granulated, and, after a few weeks, completely healed, the motions toward the end becoming more and more bile-stained, until they became quite normal. The author believed the operation was first proposed by Nussbaum, who suggested its use in cases of irremediable obstruction in the common duct. He believed that the operation had only been done once successfully before the present case, and that by Kappeler in a woman, æt. 51 years. He thought that it had never been previously performed for the cure of a biliary fistula. Since writing his paper the author had had a communication from M. Terrier, of Paris, saying that he had performed the

operation successfully in a case of irremediable obstruction of the duct, and another case had also been reported from America.—*British Medical Journal*, 1889, November 30.

## GENITO-URINARY ORGANS.

**I. On the Results of the Treatment of Hydrocele.** By Dr. E. VORWINKEL (HEIDELBERG). This article covers the cases, 90 in number, at Czerny's clinic, from 1878 to 1887 inclusive. These hospital cases are each briefly described. Then the cause and seat of the disease, the kind of operation, manner of healing, are considered, and at the end tabulated. The cases of hæmatocele and spermatocele occurring during the same period are also included, as their treatment is similar.

*A.* Cases treated by simple puncture, 2. One was a probably congenital hydrocele and the other a traumatic hæmatocele. Both were cured. This plan he has used largely in out-patient department.

*B.* Cases treated by puncture and subsequent injection of iodine solution, 48. Duration of cure 2 to 14 days (averaging 7 to 8). Rise of temperature occurred in several cases, but never suppuration. Of late he practices Englisch's method of first injecting 2% carbolic or  $1\frac{1}{20}\%$  sublimate solution, with the result of usually preventing any fever. It is known that in only 6 of the 32 cases did a relapse occur ( $81\frac{1}{4}\%$  completely cured).

*C.* Treated by puncture and injection of other solutions than iodine, 3 cases. Carbolic or sublimate solutions, or both, were here used with 1 satisfactory cure.

*D.* In which the radical operation of Volkmann was undertaken, 25. Duration of cure 10 to 49 days (average 23). Complete absence of fever in 13; uninterrupted healing of wound in 18; no relapse in 17 (of 18 known cases, or 94.5%).

*E.* In which Bergmann's total extirpation of the tunica vaginalis was undertaken, 3. Uninterrupted cures, 2 at least remaining free from relapse.

*F.* In which various modifications of the radical operation were attempted, 5; 1 was a complication with omental hernia; in another

a calcified membrane was removed; another was a multilocular cyst, etc.

G. In which castration was performed, 4.

In only 20 cases (22.3%) was any cause stated; trauma direct or indirect in 15½%; gonorrhœa in 5½%; uncertain, 1 case. This is a smaller proportion than that found by Volkmann, Bardeleben, Kocher, etc.

In 29 of 86 cases (33.7%) the trouble was on the left side; in 48 (55.8%) on the right, and in 9 (10.4%) bilateral. Previous large statistics give the two sides as about equal.

Of 83 cases 19 were first noticed from sixteenth to twentieth year (puberty); next in frequency comes the first year (hydrocele congenita).

The results of radical operations, of whatever kind, are materially better than those of puncture with subsequent injection. The only disadvantage is the longer duration of cure and, hence, inability of patient to follow his calling. Since, however, the results of puncture and injection are absolutely not bad, and this kind of operation is certainly far less dangerous to the patient, since his cases show that the most scrupulous antiseptics and continuous watching of the patient do not exclude unpleasant complications after the radical operation, he accepts unreservedly the conclusions drawn by Kocher from his collections. It cannot be taken as an unconditional dictum that no one should undertake the radical operation instead of the method of injection, unless an absolutely certain antiseptic course from beginning to end is guaranteed. On the other hand, it is not to be denied that where the course runs completely aseptic the antiseptic incision or excision leads in the surest way to a cure. Hence, the radical operation is admissible in well arranged institutions in preference to injection, whilst in private practice the latter must be adhered to.—*B uns' Beitrage z. klin. Chirg.*, 1889, bd. iv, hft. ii.

**II. Nephrectomy in Unilaterally Diseased Horseshoe-Kidney.** By PROFESSOR SOCIN (Basle). Woman, æt. 47 years. Present trouble began at the age of 17 years. Periodic attacks of pain and swelling in right hypochondrium. Great increase of trouble since

menopause, the swelling now becoming as large as a man's head, and not subsiding as rapidly as at previous attacks. For the last month this had retained its full size. Careful examination showed a  $9 \times 8$  cm. tumor, but could not decide between abdominal cyst of unknown origin or hydronephrosis, although the latter seemed more probable.

Incision on the outer border of the rectus abdominis muscle. The tumor immediately appeared, covered by mesocolon and parietal peritoneum. Puncture of the hydronephrotic sack, which was then incised and sewed to the abdominal opening. The remaining wound was closed and a tampon of iodoform gauze applied to the fistula. The clear puncture fluid showed 1022 sp. gr., and casts with albumen. Primary union of wound. From the fourth day on, some 550 grm. urine containing pus was passed by the fistula. But the ureter did not become permeable and the parenchymatous nephritis with pyelitis did not indicate the restitution of the damaged kidney. As the left kidney was evidently healthy and sufficient, at the patient's request nephrectomy was performed. This had to be abdominal. On drawing out the organ—after peeling it out largely and tying the hilus-vessels—and trying to separate the lower part this was found to be connected with the left kidney by a  $4 \times 2$  cm. tissue-bridge across the venacava, aorta and vertebral column (horseshoe-kidney). The isthms proving to be only loosely connected with the large vessels it was freed as far as the left kidney and, whilst compressed by an assistant, was slowly divided with the thermocautery. On relaxing compression 5 vessels had to be tied. The kidney capsule was then drawn and stitched over the burned surface. Further extensive adhesions to the adrenal, liver, etc., were in part divided by the thermocautery. A thick drain was passed out posteriorly on the right, at the lateral border of the quadratus lumborum muscle. Abdominal wound closed with deep and superficial sutures.

Only the first night did the urine passed contain albumen and hemoglobin, and even then no casts. Uninterrupted recovery. Discharged cured 25 days after the second operation. An examination some months later showed that she had been completely freed from her previous troubles.

Socin is not aware of any case where a horseshoe-kidney has been diagnosticated *intra vitam*, although possible characteristics were suggested by Simon; and of only 1 case of unilaterally diseased horseshoe-kidney where any attempt of an operation had been made (case of Braun, *Deut. Med. Wehr.*, 1881). In that the freeing of the adhesions to the vena cava caused such a profuse hæmorrhage that the operation had to be suspended, and the patient, also a woman, æt. 45 years, died without regaining consciousness.

He adds the statistics of 1,630 autopsies, made by Prof. M. Roth during the years 1872 to 1879 at the Pathological Institute in Basle. Horseshoe-kidney was found in 5 of these (0.3%); twice amongst 832 males (0.24%) and twice amongst 798 females (0.37%). Two cases where there was only a membranous isthmus have been published by Wenzel Gruber as great rarities.—*Bruns' Beitrage z. klin. Chir.*, 1888, bd., iv, hft., i.

WM. BROWNING (New York).

**III. Endoscopic Appearances and Endoscopic Therapy in Diseases of the Urethra and the Bladder.** By DR. E. BURCKHARDT (Basle). This double article, covering in all 148 pages with 6 wood cuts included, and 121 highly colored figures added, really represents a treatise on the subject of endoscopy and its application in practice. It begins with a historical sketch and the bibliography since 1880 by years (1880 to 1888 incl.). Next follows a brief description with method of use, of the various endoscopes (photo-endoscope, wire-endoscope, electro-endoscope), urethrosopes (also æro-urethroscope, electro-urethroscope), cystoscopes, urethral specula, the polyscope, diaphotoscope, panelectroscope, and an excellent practice-manikin made by Leiter of Vienna. He seems to use principally the Grünfeld and Nitze types of instruments, with Schutz's electric illumination or the gas incandescent. His armamentarium for endoscopic treatment is nearly the same as Grünfeld's.

The normal appearances are fully described. Cuts show the positions in examination and 20 colored figures, the various ocular appearances, whilst 11 figures are devoted to the microscopy of the local se-



cretions. He also finds the epithelial elements of any portion of the urethro-vesical tract are not characteristic barring, possibly the large squamous cells from the fundus vesicæ.

The major portion of the work is devoted to cases and their discussion.

His final summing up is as follows:

*a.* Endoscopy of the urethra and bladder is of great importance as a diagnostic aid. An absolutely certain and precise diagnosis of the diseases of the separate portions of said organs is only possible by endoscopy.

*b.* The therapy is also materially advanced by endoscopy since thereby, without any preparatory operation, the diseased parts are rendered directly accessible to vision and to instrumental interference.

*c.* The urethra is more accessible to endoscopic therapy than is the bladder.

*d.* For endoscopy of the urethra Grünfeld's method is the simplest and most practical; in that of the bladder for diagnostic purposes the electro-endoscope resp. cystoscope is preferable.

As to the various forms of disease the following holds:

1. Chronic Urethritis. In each individual case endoscopic examination should be made to establish the diagnosis. In old, long existing urethritis with great alterations of the mucous membrane, endoscopic treatment is always to be carried out, since in such cases it, of all methods of treatment affords the best and surest results. In relatively recent cases, on the contrary, it has no important advantage over present methods; here epididymitis and orchitis readily develop as a sequel to endoscopic manipulations. Hence in such cases it is not to be attempted until other local methods of treatment have failed—then only with the greatest care.

2. Posterior Urethro cystitis (so-called catarrh of the neck of the bladder). Here endoscopy is important diagnostically as well as therapeutically; the former because the exclusive localization of the morbid process to the vicinity of the entrance to the bladder can be established directly by the eye, the latter because it renders possible the local

treatment of only the diseased part to the exclusion of all that is healthy.

3. Gonorrhœic Cystitis. For this, endoscopy has only diagnostic value. By deficient anamnestic data regarding gonorrhœa, the cystoscope in combination with sounding and palpation renders it possible to exclude or to recognize the causes of the cystitis.

4. Strictures. Endoscopic examination permits the immediate distinguishing of spastic from cicatricial strictures. Anomalies of the urethra simulating strictures are likewise most easily and certainly recognized through the endoscope. The whiter and more glossy the stricture-tissue appears in the endoscopic picture and the longer the portion of the urethra involved, the more unfavorable is the prognosis, i. e., the longer will be the time required for dilatation. By the help of the endoscope it is often possible to enter strictures at first apparently impermeable. A combination of sound-treatment with the endoscopic is indicated in all cases in which an obstinate urethritis complicates the stricture.

5. Prostatitis, Prostatorrhœa. Endoscopically demonstrable changes of diagnostic importance are constantly found in the region of the prostatic portion. The most suitable method of treatment is the endoscopic application of astringents and caustics in combination with most thorough dilatation.

6. Spermatorrhœa. The endoscopically demonstrable changes of the pars-prostatica, especially of the colliculus, are to be treated locally. Since these, as a rule, resist medicamentous agents the galvano-caustic is here frequently indicated; only in the endoscope can this be done with surety against accessory injuries.

7. Hypertrophy of the Prostate. In many cases, especially at the first appearance of strangury in the beginning of the disease, a better discharge of the urine is achieved by endoscopic treatment of the pars-prostatica. Where a middle prostatic lobe is present its external configuration can be exactly determined only through the endoscope. If this middle lobe form the hindrance to the catheter its introduction can be rendered possible by the endoscopic application of the galvano-cautery. By doing this endoscopically co-injuries are more certainly

excluded than by Bottini's method, and it is done under control of the eye.

It is always indicated when a median lobe hinders the introduction of the catheter and the condition of the bladder demands local treatment.

8. Tuberculosis. Endoscopy permits a more exact determination of the localization and extent of the tubercular process than any other method of examination. Hence every operative procedure should be preceded by an endoscopic examination the result of which is decisive as to the operation.

9. Tumors. Endoscopy has an eminently diagnostic and therapeutic value in urethral tumors. All neoplasms of the urethra, excepting the rare (primary) malignant tumors, are to be removed per urethram. The kind of intra-urethral operative method is determined by the result of the endoscopic examination. In tumors of the bladder endoscopy has only diagnostic significance. It gives information as to the seat and size of the new growth. In addition it permits the excision of fragments from desired portions of the neoplasm for the purpose of pathological-anatomical examination.

10. Vesical Calculi. Endoscopy has diagnostic value only in cases of immovable diverticle-calculi that can not be touched with the sound. In multiple stones the sure determination of their number is only possible by means of the endoscope. Endoscopic examination is indicated after lithotripsy to avoid leaving calculus-fragments in the bladder.

11. Foreign Bodies. When in the urethra they are easily diagnosed and extracted endoscopically. In those of the bladder endoscopy has therapeutic as well as diagnostic value, to the extent that the certain grasping of the foreign body by the lithotriptor like instrument is rendered materially easier by a determination as exact as possible of its position in the bladder.

12. Neuroses. In relation to the diagnosis of either sensory or motor neuroses endoscopic therapy, both as regards duration of treatment and final result is to be denominated good.

13. Urethral Fistulæ. In these the endoscopic examination is only of technical interest; it often permits direct inspection of the inner fis-

tulous opening. Both in diagnosis and in treatment of such cases endoscopy is superfluous.—*Bruns' Beiträge z. klin. Chirg.*, 1889, Bd. v, hft. i and ii.

WILLIAM BROWNING (Brooklyn).

**III. The Diagnosis of Pyelonephritis.** By DR. E. DOYEN (Paris). In the course of a contribution to the literature of vesical calculus in the female, and a report of 5 cases operated upon by rapid lithotripsy through a vaginal incision, Doyen recommends the following method of determining the differential diagnosis between pyelonephritis and chronic suppurative cystitis. In order to determine the condition of the upper urinary passages, the bladder is to be emptied and thoroughly irrigated with a boric acid solution until the fluid returns perfectly clear. For 5 minutes stroking and pressing movements are to be made along both kidneys and ureters; this is followed by another catheterization. Even in very well marked cases of cystitis the mucous membrane of the bladder will furnish but an insignificant amount of pus and debris, while in cases of pyelonephritis the second catheterization will bring away from 8 to 10 ccm. of characteristic fluid containing pus.—*Bull. et. Mem. Soc. Chirg. de Paris*, T. xiv, p. 397.

**IV. Folliculitis Preputialis and Para-Urethral Gonorrhœa.** By DR. OEDMANSON. While gonorrhœal diseases in the female genital organs and their accessory glands have been the subject of study for a considerable time, similiar diseases in men have received relatively little attention. The para-urethral glands opening into the urethra are comparatively unaccessible; on the contrary the follicles opening upon the skin itself, although existing exceptionally, are of considerable practical importance in cases of gonorrhœal disease. The secretion containing gonococci, trickling from the mouths of these follicles, may not only cause repeated reinfection of the male urethra, but in spite of the apparent cure of the urethral lesion, may become the source of infection to others.

He relates 2 cases of gonorrhœa in which the existence of these preputial follicles were found to exist, and in which infection of the same occurred. The repeated return of the disease after its seeming

cure in one of these cases led him to adopt the radical method of excision of the entire structure. A complete and permanent cure followed this procedure.

The demonstration of the existence of the gonococci in the ducts of these follicles disposes of the theory of Bruns, who declared that these organisms were only found to be capable of propagation in cylindrical epithelium. The further fact that the fossa navicularis and the posterior urethra, despite the existence of a covering of pavement epithelium, become infected with gonorrhœa, is convincing proof of the error of Bruns' assertion.

The treatment of gonorrhœal preputial folliculitis consists of cauterizations, and this failing, incision and scraping, and finally excision. —*Archiv. f. Dermat. u. Syph.*, 1889, hft. 1.

**V. Method of Amputation of the Penis.** By DR KIRIAC (Roumania) Kiriac claims for the following operation of Assaky the advantages of not forming the funnel shaped opening representing the meatus urinarius, and the retraction of the same.

A rubber catheter is introduced into the urethra, a ligature placed about the root of the penis, making moderate pressure, the integumentary coverings of the organ being well retracted and fixed. Beyond the diseased part, the skin and superficial fascia are circularly incised, the dorsal artery and vein being ligatured. By means of two lateral incisions from 1 to 2 cm. long the corpora cavernosa of the penis are separated from the corpus cavernosum of the urethra, being careful to arrest all hæmorrhage, which is quite likely to take place at this stage of the operation, the former being incised transversely at the level of the wound in the edge of the skin from within outwards. The urethra is now separated 1 cm. above this cross-incision. After ligature or acupressure of the deep artery of the penis, or other small bleeding vessels, the elastic ligature is removed; thereupon a slight retraction of the spongy portion of the urethra takes place. The corpora cavernosa are then sutured; with 3 catgut sutures the covering of the spongy portion of the urethra is traversed in a cross direction and from below upwards. These are drawn together in such a manner as to leave a

narrow cross slit; the spongy portion forms a hood shaped covering, which, protected by the proper tunic of the spongy urethra, guards against hæmorrhage and the entrance of micro-organisms. The skin covering of the stump will be found unnecessarily wide; this is corrected by excising a wedge-shaped piece from either side and uniting with the reflected mucous membrane. Antiseptic dressing over a catheter, left in situ, and later on iodoform collodion, suffices for protection of the wound.—*Centbl.f. Chirg*, 1889, No. 13.

G. R. FOWLER (Brooklyn.)

**VI. Hypospadias Complicated with Congenital Stricture of the Urethra.** By DR. J. ENGLISH (Vienna). In general, in cases of hypospadias, the only stricture found is that of the abnormally situated meatus, but deformities of the other parts of the urethra may exist, and the most noteworthy is congenital stenosis. Its effects are dependent upon its size and length. Most patients only complain of the smallness of the stream of urine, without any other difficulty. Others will complain not only of the size of the streams, but specially of its slowness and of the amount of force and abdominal pressure which is necessary to start it. These latter cases are explained by the length of the strictured part of the urethra which is adjacent to the meatus. The most common form of congenital stricture is that of the abnormally placed external meatus. Of this there are two forms. The meatus is situated either in the funnel shaped depression which is formed by the divided fossa navicularis, or a piece of skin or a cicatrix is situated between the slit of the fossa navicularis and the abnormal meatus. In the first case there is seldom a stricture of the urethra. In the second case the meatus seems to be surrounded by cicatricial tissue and it is sometimes necessary to divide it. Less frequently marked strictures of the urethra adjacent to the meatus are found.

There is no doubt that as a consequence of the difficulty in urination due to a contraction of the meatus, disturbances in that function may occur, but they are all referable to the irritation caused by stasis of urine, and are always inflammatory; they are pain on micturition, local burning, and later on marked smallness of the stream. In cases of congenital stricture of the urethra these symptoms are reversed; from

birth there will be a marked smallness of the stream, lengthy micturition, marked abdominal pressure, and afterwards the secondary inflammatory changes occur and are always accompanied by severe symptoms. There is a marked dilatation of the above-lying urethra, which is evidenced by the dribbling of urine and later on a dilatation of the bladder, ureters and kidneys. This dilatation does not seem to cause much disturbance at first; on the contrary the patients appear well, and the urine is normal; but such patients resent the slightest irritation and the passage of a sound sets up marked urethral fever.

If the disturbances of micturition last a long time inflammatory processes are set up in the upper urinary organs, not so marked in the bladder as in the ureters, pelves of the kidneys and the kidneys themselves. Chills often usher in the increase of the symptoms, there is a daily fever, pain in one or both lumbar regions, often accompanied by uræmic symptoms. The patients emaciate, become cachectic.

These cases are sometimes mistaken for intermittent fever.

The writer reports 3 interesting cases treated by him.

The length of the congenital stricture in his cases varied from 1 to 4 cms., and in each case there was more or less cavernitis due to stasis of urine in the dilated urethra behind the stricture.

The treatment consisted in reducing the inflammation by cold and in the gradual dilatation by soft instruments. The strictures at first were only pervious to filiform bougies and in no case was it possible to go higher than No. 8 English.

All cases were followed by more or less reaction. Inflammation of Cowper's gland and abscess in one case, epididymitis in another and more or less urethritis in the third.

The cure could not be termed permanent for the patients had to keep on passing instruments on themselves to prevent recurrence of the condition.—*Wiener Med. Woch.*, Nos. 40 to 43, 1889.

**VII. Drainage of the Bladder After Suprapubic Cystotomy.** By Dr. H. BURCKHARDT (Stuttgart). One of the great objections urged by surgeons against supra-pubic cystotomy is the difficulty of draining the bladder. A catheter "à demeure" does not work

at all if the bladder wound be left open, and it cannot be relied on when the wound has been sutured.

If primary suture of the bladder is not attempted, and the urine is allowed to escape through this opening till it has healed by granulation, then it is extremely difficult to keep the patient clean and dry. To do away with all these inconveniences, the writer has during the past five years employed a method which was first used by Frere Come, in the 18th century, but with another end in view. It is well known that this famous lithotomist, previous to opening the bladder from above, made the "boutonniere," so as to pass a "sonde a dard" from the urethra into the bladder, and open this viscus above the symphysis from within outward, and after having removed the stone by the suprapubic incision, he inserted a tube through the perineal wound into the bladder and left it there several days.

This method was abandoned and has not been employed methodically by any modern surgeon.

In 1884 the writer, for the first time, employed this method in the case of a man, æt. 64 years, with a stricture of 20 years' standing, and suffering from stone. As the patient was in poor condition, and had had numerous chills, and the urine was strongly alkaline, containing much albumen, and the stricture admitting only a No. 7 English catheter, the writer decided to combine an external urethrotomy with the epicystotomy and drain the bladder through the perineal wound. The patient stood the operation perfectly and made a good recovery, both wounds healing kindly. The drainage worked satisfactorily for one and one-half days, and then afterward in a very unsatisfactory manner, but it permitted a perfect cleansing of the bladder. Since then the writer always combined vesico-perineal drainage with every case of epicystotomy, as it permits of a more rapid and perfect closure of the suprapubic wound, and the perineal incision heals rapidly after the tube is removed.

He does his suprapubic cystotomy with only a moderately distended bladder, and does not employ the rectal dilator, stating that if the pubis be hugged closely and only a small segment of the bladder be exposed



before pushing back the peritoneum, the viscus may be opened with safety.

In establishing a perineal opening it is done in the same way as the "boutonniere" operation, the urethra being opened on a sound, the only difference being that usually there is a healthy urethra to deal with instead of a strictured one.

For drainage he employs a rubber tube, 1 cm. in diameter, with very thick walls; the tube is perforated in a couple of places and pushed up to the posterior wall of the bladder, and no openings are made in the tube near the anterior wall of the bladder, and where it passes through the urethra. To prevent his drainage tube from slipping out of place, he fastens it to the perineum by a wire suture.

He closes the bladder by catgut etage suture and packs the overlying wound with iodoform gauze. He seldom allows his perineal drainage tube to remain in place over eight days.—*Centbl. f. Chirg.*, 1889, No. 42.

F. C. HUSSON (New York).

## EXTREMITIES.

**I. On Perforating Cutaneous Ulcers in Consequence of Neuritis.** By DR. P. HELBING (Tübingen). This article is based on a case of perforating ulcer of the upper extremity—the first one known in which a histological examination was also obtained. The patient was a working man, æt. 52 years. His trouble began with a painful swelling of the whole right arm 15 years previously. This in a few weeks subsided somewhat, leaving eight red spots on palm and dorsum of hand that broke and discharged. These healed up in about 10 weeks. The next outbreak occurred 11 years later, and this time on the upper arm. A couple of years later a like process attacked the little finger, with loss of the end and part of the second phalanx. Quite recently the elbow became involved.

Sensation in right arm diminished since first attack; subjective feeling of coldness in it; pressure, temperature and localization senses decidedly impaired, whilst that for pain is almost lost (analgesia). Right arm somewhat fuller than left, partly from œdema. Nails on right

hand are short, dry and cracked. Scars of the former troubles. Faradic reactions normal. Patient otherwise healthy. At his earnest wish the arm was amputated a little below the middle of the humeral portion. Primary union. Man discharged in 13 days.

The joint surfaces of the elbow were largely denuded of cartilage. The three main nerve trunks of the arm were much thickened, the median being of more than double size. A microscopical examination of these was made by Prof. Nauwerck who found a chronic neuritis with atrophy of the nervous elements. The atrophy of the median was not excessive where most affected, not over a quarter to a third of the nerve-fibers being lost. Endoneurium, perineurium and vessels variably thickened and sclerotic. On the ulnar and radial a neuritis characterized by infiltration and proliferation, the atrophy being slight. Clinically and histologically, then, this was a case of limited neuritis. The various known causes are gone over, but as none was found here the case is put down as spontaneous. This neuritis was without doubt the cause of the trophic disturbance.

The case is analogous to what is known as perforating ulcer of the foot. Péraire (*Arch. Gen. de Med.*, 1886) has collected 27 similar cases affecting the hand, under the term "mal perforant palmaire." In 19 of these local nerve injury was the cause, whilst in 8 he assumed a central origin (tabes, myelitis, etc.) One of his cases (from Rabainé) was very similar to that of Helbing. The pathological process in such troubles Helbing considers, in harmony with Pitre's and Vaillard's observations on the lower extremities, to be an interstitial inflammation, documenting itself by a nuclear increase in the neuro-connective tissue, with secondary atrophy of the nerve-elements.—*Bruns' Beiträge z. klin. Chirg.*, 1889, Bd. v., hft. ii.

WILLIAM BROWNING (Brooklyn).

## TUMORS, ABSCESSSES.

**I. Lupus Treated with Ice.** By KLAUS HANSSEN. A woman suffering from lupus of the lower lip and chin was treated by means of caustics, the galvano-cautery and curetting under chloroform (narco-

sis), without, however, a definite cure following; on the contrary, the disease spread. There was simultaneously such a sensitiveness of the diseased place that the slightest procedure, as for example, dressing with iodoform, would cause exquisite pain, which could not even be prevented by cocaine. The writer, after a third and vain curettement, applied ice, as recommended by Gerhardt, and within three days he obtained not only a reduction of the sensitiveness, but in the course of a few weeks healing of the wound and a disappearance of the nodes. Three months thereafter there was no recurrence —*Medicinsk Revue*, 5, 1889

F. H. PRITCHARD (Boston).

**II. A Study of the Locations of 7881 Primary Carcinoma as Illustrating the Probability of a Cancerous Microbe.** By EDMUND ANDREWS, M.D. (Chicago). 1. Other things being equal, primary carcinoma is most frequent on those surfaces which by their position would be most accessible to free swimming microbes or spores derived from without the body.

2. The liability to cancer is increased if the epithelial surface is so situated that the spores can remain upon it for at least some hours without being washed away, as on the lower lip; but the liability is greatly diminished if the parts are frequently swept off, as the globe of the eye by winking, or the œsophagus by swallowing food and drink.

3. The liability to cancer is great if the membrane has vast numbers of deep glandular follicles into which the spores can penetrate and lie free from disturbance and have direct access to the more delicate epithelial cells, as at the pyloric end of the stomach and the follicles of the mammary glands.

4. Those portions of the skin which are usually uncovered are oftener attacked than those covered with clothing and constantly brushed by its friction. The skin of the face, for instance, produces more cancer than all the covered portions of the integument combined.

5. As might be expected, there are a few seeming exceptions to these rules, but so few that they do not break their general force.

LOCATIONS.	Total No. of Cases.	From record in Mercy Hospital and in private practice.	From other American reports.	From Hospitals of London.	From Hospitals of Paris, 3 years.	From Imperial Hospital, in Vienna, 7 years.
<i>Alimentary Canal and Appendages.</i>						
Lips (nearly all lower lip).....	481	94	31	71	135	150
Tongue.....	169	17	25	53	62	39
Other parts of mouth .....	244	21	12	25	87	99
Salivary glands.....	30	5	2	.....	15	8
Esophagus.....	59	1	41	6	5	6
Stomach.....	1,945	212	846	27	688	172
Intestines.....	127	1	14	5	52	55
Pancreas.....	22	.....	17	.....	5	.....
Rectum and anus.....	280	24	74	36	115	31
<i>Genito-Urinary Tract.</i>						
Penis.....	62	5	7	13	4	33
Urethra.....	4	.....	.....	.....	.....	4
Prostate gland.....	8	1	3	.....	2	2
Testes.....	62	16	6	4	14	21
Bladder.....	46	1	17	8	6	14
Ureters.....	.....	.....	.....	.....	.....	.....
Kidneys.....	43	1	29	5	4	4
Vulva.....	30	1	2	4	3	20
Vagina.....	25	.....	9	.....	.....	16
Uterus.....	2,308	252	553	82	1018	403
Ovaries.....	54	.....	44	.....	7	3
<i>Eyes, Ears and Air-Passages.</i>						
Eye-lids and conjunctiva.....	41	3	.....	.....	10	28
Ear.....	6	2	.....	2	.....	2
Nasal passages.....	3	2	.....	.....	.....	1
Larynx.....	16	.....	6	2	1	7
<i>Epidermic Surfaces and Appended Glands</i>						
Face... ..	327	44	80	2	131	70
Hands.....	39	8	8	.....	14	9
Surfaces of the body covered by clothing..	191	37	35	57	17	45
Mammary Glands .....	1,232	170	260	154	316	332
Grand Total.....	7,881	.....	.....	.....	.....	.....

This liability of different surfaces to cancer in proportion to their exposure to germs, and their ability to afford them an undisturbed lodgment, is still more strikingly shown if we compare equal areas of different surfaces. I have calculated the areas of the different organs and the proportion of cancer to the same area in all. Suppose the intestines to present one cancer on a given area of surface, then the number of cancers on the same area of other organs will be as follows:

*Table showing the liability of equal areas of different surfaces to cancerous infection, the liability of intestine being assumed as 1:*

Lower lip,	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8,448
Tongue,	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,232
Rest of mouth and fauces,	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	264
Esophagus,	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	242
Stomach,	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	572
Intestines,	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Rectum and anus,	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	396
Skin of the face,	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	264
Hands,	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	22
Surfaces covered with clothing,	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4
Vulva,	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	264
Vagina,	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	61
Cervix uteri,	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5,776

This shows that, in proportion to its area, the liability of the probium of the lower lip to cancer is 8,448 times greater than a similar area of intestine, while that of the tongue is 1,232, of the stomach 572, and of the anus and rectum 396, the rest of the intestine being only 1. The liability of the face is 264, while that of the covered portions of the body is only 4.

There is one organ which is rebellious to every theory yet devised, my own included, and that is the Schneiderian membrane of the nose. It is extremely exposed to irritation and inflammation, and also to the reception of external germs of every kind, and yet it is rarely attacked with cancer. It is an organ standing by itself, so to speak, and possessing an exemption from attack which at present is unexplained — *Journal of the American Medical Association*, 1889, November 23.

### III. Successful Experimental Transfer of Carcinoma.

By DR. A. HANAN (Zurich). Hanan transferred small portions of a secondary growth in the inguinal and axillary glands of a white rat, dead from carcinoma of the vulva, to the abdominal cavities of two other rats. The first animal died at the end of two months, and there was found in its abdominal cavity, in the omentum, fully developed nodules rich in the cellular elements of carcinoma. In the other animal, treated soon after the experiment, the development of newly found tissue was not so complete as in the first case, but there was every reason to believe that the new formation tissue constituted, as in the first instance, a successful vaccination of carcinoma.—*Fortschr. der Med.*, 1889.

IV. The Treatment of Cold Abscesses. By W. J. VAN STOCKUM (Leyden). The author enters upon the study of the various methods of treatment of cold abscesses, particularly those of Verneuil and v. Bruns, by means of injections of iodoform in ether, solution. He employed an 8 or 10% solution of iodoform in ether, and at no time was more than 5 grammes of iodoform, nor 100 grammes of ether injected. Iodoform poisoning did not occur, but occasionally ether intoxication was observed. The results obtained were not so favorable as those claimed by other observers. The majority of his cases, however, were abscesses resulting from caries of the vertebræ, or occurring in connection with acute inflammation in joints. In his opinion, the treatment by injection of iodoform in ether is only indicated in cases of large abscesses whose situation renders difficult operative antiseptic treatment, as for instance, in large abscess in the neighborhood of the hip-joint; as preparatory to resection of the diseased parts; in small idiopathic abscess of the soft parts, or in cases where the primary ostitis has subsided. It is contraindicated in cases of acute granular ostitis, where nothing short of total extirpation of the diseased parts will suffice. Comparative observations were made with the view of determining the influence upon the abscess wall of the iodoform ether, after puncture, as well as simple puncture. He concludes as follows:

1. Sterilization of the contents of an abscess may be said to have

occurred, if, after being treated by puncture and iodoform injection, healing takes place.

2. Iodoform in ether solution is not to be relied upon in the sterilization of the walls of an abscess.

3. Temporary sterilization is not always followed by permanent cure.

If repeated punctures become necessary, the iodoform injections must be repeated likewise, as one cannot always be certain that tubercle bacilli are in an active state.—*Inaug. Dissert.*, 1888.

## BONES. JOINTS, ORTHOPÆDIC.

**I. Upon the Pathology of Joint Tuberculosis; Particularly That of the Foot.** By Drs. SCHMID—MONNARD. After some general considerations, Schmid discusses tuberculosis of the ankle and tarsal joints, particularly from the standpoint of treatment. The treatment advocated is early resection of the diseased joints, this being based upon the results obtained in nine cases treated in the private clinic of Neuber. In these cases rapid healing with a useful member occurred invariably. A short but "energetic" conservative treatment is advocated preliminarily. The transverse dorsal incision of Hueter was employed in four of the cases. Three of these cases were subsequently examined by Schmid, when the wounds were found perfectly healed. Neither nerve nor tendon suture were employed, yet sensibility of the parts below the incision was present, no trophic disturbances existed, and movements of the toes were performed with facility. Total resection is urged, rather than partial, in order that no tubercular foci remain in the bone, to delay the primary healing, and lead to recurrence of the disease. It is stated, whereas on the one hand, conservative treatment gives no better results as regards usefulness of the member than operations, on the other hand those individuals attacked with abscess in tubercular disease of these parts, almost invariably perished finally, if left to themselves.—*Monograph*.

G. R. FOWLER (Brooklyn).

**II. Fractura Tuberositatis Tibiæ.** By J. LANDSBERG. A gymnast, æt. 16 years, in exercising, attempted to jump upon a wooden horse; he struck his leg against it, and in jumping off his left leg failed him and he had to be carried home. The same afternoon the left leg was swollen, the patella pushed upward about 10 cm. Ten cm. below its lower end a small movable piece of bone could be felt. It was not painful while he laid still, yet the limb could not be used. It was diagnosed as fracture of the patella; an incision was made transversely to the patella, when the error was explained. A longitudinal incision was then made in the middle of the patella downwards and the torn off tuberosity replaced by means of a pin upon the tibia. When this was removed fourteen days after the tuberosity was found adherent. After three months treatment with massage and passive movements he could go about.—*Medicinsk Revue f.* 1889.

A. PICK (Boston.)

#### GYNÆCOLOGICAL.

**I. Successful Supravaginal Amputation of Uterus for Rupture.** By HENRY C. COE (New York). Abdomen opened; head of child found protruding through a rent which extended upwards from cervix through left broad ligament and lower uterine segment. Uterus turned out of abdominal cavity, cervix constricted by tube, child extracted through rent, uterus and ovaries excised, bleeding vessels ligated, torn peritoneum sewed with continuous catgut; toilet; no drainage. Recovery from cervico-vesico-vaginal fistula from sloughing.

Coe relates a similar case ending fatally, in which M. Price delivered a child by version before operating, and remarks:

"I am sure that an attempt at version on my part would have terminated the case fatally in a few minutes. Since the child was dead in all the cases reported, there seems to be no reason why we should destroy the small chance which the mother has of being saved by laparotomy by trying to perform version with the certain risk of increasing the tear in the uterus and adding to the existing shock—that is, if we intend to perform laparotomy at all."—*New York Med. Jour.*, Nov. 2, 1889, p. 478.

FRANCIS C. HAYNES (Los Angeles, Cal.)



## REVIEWS OF BOOKS

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RECTAL AND ANAL SURGERY, WITH DESCRIPTION OF THE SECRET METHODS OF THE ITINERANT SPECIALISTS. By EDWARD ANDREWS, M.D., LL.D., and EDWARD WYLLYS ANDREWS, A.M., M.D. Second Edition revised and enlarged with illustrations and formulary, 8vo. pp. 140. Chicago. W. T. Keener. 1889.

This is an attractive manual, well printed and copiously illustrated. The authors in their preface state that it has been written for the purpose of diffusing more widely information upon (1) what are the best modern methods of diagnosis and treatment in rectal and anal diseases known to the regular medical profession? and (2) what are the secret methods of so-called rectal specialists, and what is their value?

It would seem that during the last fifteen years an epidemic of rectal specialists has prevailed in the Mississippi Valley, and that their success in curing piles "without pain or operation" by certain secret methods had been such as to give them great reputation and to cast much discredit on the regular profession. These methods of the charlatans are shown in this book to be often inefficient and sometimes dangerous, and their frequent apparent superiority to the work of regular practitioners to be due only to neglect in the study and treatment of common surgical affections of the rectum and anus upon the part of the latter.

The present work assumes to be practical in its scope, and accordingly gives a minor place to historical and theoretical considerations for which the reader is referred to the works of others.

The book begins with a very brief description of the anatomy of the lower rectum and anus. Then follows a chapter on methods of examination. Of course thoroughness of examination is insisted upon. Nothing is said however of the fact that in many cases the requisite thoroughness of examination can only be secured by the help of a preliminary anæsthesia. Indeed it is safe to say that examinations which are worthy of the name of "thorough" can not be otherwise made. The authors recommend the use of a "full-sized" tubular speculum whenever a critical inspection of every point in the rectal walls is desired, even for parts near the outlet. They do not, however, define what constitutes a "full-sized" tube to do the work set for it; however, its size must be sufficient in any given case to distend the rectum and efface its folds. A tube which will do this must be a cylinder of no mean dimensions, and there is reason to doubt whether in any case such a tube is ever used. Those who would banish tubular specula from rectal as well as vaginal examinations have much to support their position. Some sort of a valued speculum which, after having been introduced, can have its blades separated at the will of the examiner so as to fully distend the rectum, and by various adjustments to expose any part to be examined, certainly makes thorough examination of the lower rectum much more easy and certain than a tubular instrument. The criticism made by the authors against certain valued specula named, that the blades are too short, has no weight, for there is nothing to prevent the blades from being made longer. A more reasonable criticism would have been that these instruments were too complicated in their mechanism, for equally efficient and much simpler valued specula than those figured in this book may be obtained.

The largest chapter, and evidently the one in which the most work has been put, is the one devoted to the consideration of "Hæmorrhoids or Piles." Though the discussion of the etiology and pathology of piles is all too brief, there is a passing reference to what the authors call a remarkable erectile power manifested by hæmorrhoidal tumors. Had the authors amplified this idea, and demonstrated—as certainly can be done—that a large proportion of these tumors are identical in

their structure with angiomatous tumors in other parts of the body, they would have established a broad and excellent foundation for the discussion of the treatment of the affection. The principles which determine the treatment of vascular tumors in general are equally applicable to the treatment of such tumors at the anal verge, and when surgeons begin to recognize this fact, and teachers begin to align their teaching in accordance with it, then the treatment of piles will be lifted out of the slough of empiricism and partisanship in which it has hitherto been mired.

In regard to treatment of piles, after a paragraph devoted to some judicious and excellent recommendations as to the hygiene of the rectum, and a reference to the possible value in some cases of simple dilatation of the sphincters, the treatment by ligature is taken up. In almost all internal hæmorrhoids the ligature is advised on account of its claimed superior safety. A preliminary forced dilatation of the sphincters is even said to be unnecessary in a large proportion of cases. The injection into piles of coagulating and irritating fluids is condemned as dangerous. It is by his work in expressing the methods of itinerant quacks in the use of the injection method of treating piles that Dr. Andrews is especially known. He states that of 3,304 cases reported to him, in which this method was used, there were 13 deaths, besides a large number of dangerous abscesses, sloughing and hæmorrhages. It ought not to be overlooked, however, that doubtless when it became known that the author was collecting statistics on this subject, the disasters were reported to him in undue proportion, and that the real proportion of disasters is less than these figures would show. The reckless use by ignorant men of any method of treatment might easily bring it into disrepute and cause an appalling list of disasters to accumulate, chargeable to it. We are inclined to think that the unavoidable danger inherent in the use of coagulating injections into piles are exaggerated by these authors, and that in quite a considerable proportion of cases, this method will be found to be the one most feasible, and equally safe with any other. Within a short time two cases have come to our personal notice in which death has followed

the use of the ligature for piles although applied by surgeons of eminent ability. Were we to be influenced by these cases alone, the ligature would be abandoned altogether. But over against them we find the experience of another surgeon who has had but one death in more than 4,000 cases, and the ligature resumes its place as a fairly safe resource.

The clamp and cautery, and the *écraseur*, the actual cautery and potential caustics are mentioned, but very briefly. The authors apparently have no use for them. This chapter closes with a description of the method of excision of hæmorrhoids advocated by Mr. Whitehead, of England. The authors have never practiced the operation, and decline to use it. The objections urged by them are (1) that torsion of the arterioles cut during the operation is not a sufficiently secure method of guarding against hæmorrhage, and (2) that union by first intention will not always take place and that in the event of its failure, subsequent stricture is likely to follow. With regard to the first of these objections, however, one is led to inquire why not tie the arteries, if torsion is unreliable. With regard to the second objection it is sufficient say that to whatever the unpleasant *sequelæ* which in the experience of some operators have attended this operation, stricture is not one of them.

This operation, it seems to us, is worthy of much more commendation than is here accorded it. It commends itself as a scientific surgical procedure to one who appreciates the pathological anatomy of the disease which is to be removed. It is not, however, a procedure which is likely to be undertaken by gentlemen having little experience in practical surgical work. It has its special indication in the more extensive and aggravated points of hæmorrhoidal disease. Such cases should be referred for treatment, not to persons skilled only in what might be called tittivating methods of local treatment, but to general surgeons who have the skill and experience requisite for carrying out a major surgical procedure.

Brief chapters on Proctitis and on diseases of the *Sacculi Horneri* are followed by a chapter devoted to Ischio-rectal abscesses and to *Fistulæ in Ano*. Division by the knife and packing is the method

recommended for attacking such fistulæ as need operative relief. The possibility of dissecting out certain fistulæ and securing primary union of the wound left is not suggested. It is plainly and well stated that by proper attention to drainage and the use of stimulating antiseptic applications many cases of anal fistulæ may be brought to a spontaneous healing without recourse to any cutting operation. For fistulæ of the anus a simple incision a little longer than the fissure itself, along the deepest part of the fissure through one-third or one-half of the thickness of the sphincter is recommended as being quite sufficient to secure a radical cure.

Prolapse of the rectum, Polypus, Stricture are next in turn considered. A short chapter is also given to Malignant Tumors of the Rectum and anus. Then Malformations of the Rectum, Pruritus Ani, and Mechanical Injuries are in turn treated of. A collection of about 50 formulæ or medicaments for local use closes the volume.

The work is well written and is clear and forcible in its phraseology. It is not intended to be an exhaustive treatise on the subjects taken in it. The authors have well fulfilled the task set before them, and the work cannot fail to be of great use in diffusing a sound knowledge of rectal and anal surgery.

L. S. PILCHER.

THE AMERICAN ARMAMENTARIUM CHIRURGICUM. New York. George Tiemann & Co., Imp. 8vo., pp. 862.

This is primarily an instrument-maker's catalogue and price list, but it is put in a shape that it makes it practically a treatise on surgical instruments and operative surgery. Over 3400 engravings illustrate the instruments, and very many of them are accompanied by text descriptions of the purposes and manner of their use. Usually this text is a reprint from articles written by the original devisers of the instrument. In turning over the pages of this book we have been greatly interested. The future student of the history of surgical technics will find this work a rich mine for his explorations. For every-day reference, the surgeon

who has not personal access to a large instrument-dealer's stores, will find this work a most valuable guide to aid him in the selection of instruments for any special work.

L. S. PILCHER.

# ON THE SYMPTOMS OF CHRONIC OBSTRUCTION OF THE COMMON BILE DUCT BY GALLSTONES.<sup>1</sup>

By WILLIAM OSLER, M.D.,

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PHYSICIAN TO THE JOHNS HOPKINS HOSPITAL.

SINCE the bile passages have been brought within the sphere of surgery, a renewed interest has been taken in all symptoms which give us more accurate knowledge of the character and situation of lesions in these parts; and I wish particularly in this paper to deal with a form of fever met with chiefly in chronic obstruction of the common duct by gallstones, as it possesses features of the greatest importance for diagnostic purposes. The fever I speak of is intermittent in character and the cases present the following group of symptoms:

1. Jaundice of varying intensity, deepening after each paroxysm, and which may persist for months or even years.
2. Ague-like paroxysms characterized by chill, fever and sweating, after which the jaundice usually becomes more intense.
3. At the same time of the paroxysms, pains in the region of the liver, with gastric disturbance.

In a majority of cases this combination of symptoms is, I believe, characteristic of the existence of gallstones in the common duct.

We meet with rigors, fever and sweats in three conditions of the bile passages:

As an acute and transitory process in ordinary hepatic colic associated with the passage of a stone through the duct.

<sup>1</sup>A portion of a memoir entitled "Fever of Hepatic Origin, Particularly the Intermittent Pyrexia Associated with Gallstones," published in the Johns Hopkins Hospital Reports, Vol. ii, No. 1.

In chronic obstruction of the duct, usually by stone, without lesions of the bile passages other than dilatation and catarrhal cholangitis.

In suppurative cholangitis produced by gallstones or other causes.

With the first of these I am not specially concerned, except so far as it may help to explain the occurrence of the paroxysms in the second group. The distinction between the cases of suppurative cholangitis and those of the second category shall be considered subsequently, and I shall now proceed to speak of intermittent hepatic fever with its associated symptoms as characteristic of chronic obstruction of the duct by gallstones and without suppuration.

The literature of the subject, though interesting, need not, for the purposes of this paper, be discussed at length. Of the numerous writers on gallstones during the last century, Soemmering<sup>1</sup> appears to be the only one to mention the symptom, using the phrase, in speaking of the fever associated with gallstones, "et ipsa febris intermittens."

We owe to French physicians our knowledge of this valuable symptom. Monneret<sup>2</sup> is usually credited with its recognition, but the thesis of Magnin<sup>3</sup> and the work of Charcot<sup>4</sup> present us with the first satisfactory studies, from which indeed has been derived most of the information on the subject which we find scattered through the textbooks and monographs.

Among German writers the work of Frerichs contains many cases, illustrating this symptom of chronic obstruction, but he does not appear to lay special stress upon its importance in diagnosis. In von Schueppel's article upon gallstones, in Ziemssen's *Cyclopædia*,<sup>5</sup> the remarks are based on the work of the French writers. Wagner<sup>6</sup> has reported interesting cases.

<sup>1</sup>De Concrementis billiariis, 1795.

<sup>2</sup>Pathologie Interne, Tome I.

<sup>3</sup>Paris, 1869.

<sup>4</sup>Leçons sur les Maladies du Foie, 1877.

<sup>5</sup>Vol. ix.

<sup>6</sup>Deutsches Archiv. f. klin. Med., Bd. xxxiv.



References to these symptoms occur in the various German text-books, but the question does not appear to have received the full consideration which its importance demands, and the majority of the writers, as Strümpell, for example, speak of the *fièvre intermittente hépatique* as if it were always associated with suppuration.

Among English writers, Murchison, in his work upon the liver (third edition), notes the occurrence of rigors in chronic obstruction, and in his paper upon conditions causing an intermittent fever,<sup>1</sup> he deals more fully with the general features of the affection. Harley, in his work on the liver, does not mention it. Ord refers to it in his paper on some of the rarer symptoms produced by gallstone.<sup>2</sup> In the English text-books on medicine, it is not often spoken of; even Fagge, whose work is such a store-house of clinical facts, has no reference to the subject.

In this country, the question has been discussed by Bartholow, who gives, in Pepper's System of Medicine, a full summary of the French observations. In Sajous' Annual for 1888, Dr. W. H. Thompson, of New York, refers to intermittent hepatic fever as occurring frequently in this country and as well recognized by authors; but in a private communication he informs me that he had been under a misapprehension, and so far as he knows the subject had not been discussed by any American writer. Musser,<sup>3</sup> of Philadelphia, has reported several interesting cases.

The following cases have been under my observation :

CASE I.—*Jaundice of three years' duration. Repeated attacks of chills and fever; cholæmia, death. Gallstones in common duct.*

J. H. R., æt. 68 years, admitted to the Johns Hopkins Hospital, May 25th, 1889, complaining of jaundice, chills and fever, which had lasted on and off for three years. With the exception of attacks of

<sup>1</sup>Lancet, 1879.

<sup>2</sup>British Medical Journal, 1887, 1.

<sup>3</sup>On Paroxysmal Fever, not Malarial. Proceedings of the Philadelphia County Medical Society, 1884.

eczema, he had been a healthy man until three years ago, when his present trouble began with dyspepsia and pain in the pit of the stomach. In the first attack there was sharp pain in the epigastrium, followed by a chill and vomiting. These recurred very frequently and with them he invariably became deeply jaundiced and the stools were putty colored. He had been subject to catarrh of the stomach and had always been constipated. The attacks of chills and fever had, at times, been very severe, and he would sweat heavily after them. On the occasion of his first visit to hospital a violent attack came on while he was in the waiting room; he shook as in an ague paroxysm. His wife stated that he had rarely passed three weeks without a chill of great severity.

*Present condition.*—Much emaciation; skin dry and harsh and of an intensely bronze color. It presented many small scabs, the result of scratching. The muscles were very flabby. The conjunctivæ and mucous membrane of the mouth were stained, as were also the nails of the fingers and toes. The expression of the face was dull and the speech slow. Articulation was impaired from dryness of the mouth. Examination of the thoracic organs negative. Pulse 68, small and regular. Abdomen was a little distended, somewhat tympanitic, everywhere painless.

The edge of the liver could not be felt. Dullness in mammary line began at the 6th rib and extended  $2\frac{1}{2}$  inches (6+cm.) vertically. The most careful palpation could not discover the gall bladder. The splenic dullness was slightly increased, but the edge was not palpable. The urine was of a deep brownish-red color, acid in reaction, specific gravity 1008. It contained a small amount of albumen and a few tube casts. Temperature on admission was 98°. His chief complaints were of intense itching of skin and of occasional pains in the abdomen.

On the morning of the 26th he had a chill, in which the temperature rose to 101° and he became delirious, would not answer questions, and wanted constantly to get out of bed. The temperature sank to about 96° and remained at that point until eleven o'clock when it rose to 97°. Gradually coma supervened; the pulse rate increased to 160 and the respiration became very irregular, 30 per minute. He was given an active purge and sweated. The coma gradually deepened; the temperature rose, reaching towards evening 101°. He died early on the morning of the 27th.

From his history and the repeated attacks of hepatic intermittent fever extending over a period of three years (a period of sufficient

length to exclude suppurative cholangitis, abscess, or cancer) I made a diagnosis of obstruction of the common duct by gall stones, and suggested to him the propriety of an operation. To this he had given his consent, and entered the hospital with a view of remaining a week to gain strength before submitting to it.

*Post-Mortem*, by Dr. Welch. Peritoneum contained 30 cc. of yellow serum.

In thorax the pleural membranes were normal. The pericardium contained an excess of fluid. The heart was a little enlarged, weighing  $11\frac{1}{2}$  oz. (326+gms.) The segments of the aortic valve were indurated along free and attached margins. On the aortic aspect of one segment was a fresh, reddish-gray, partially detached, vegetation. The remaining two segments had coalesced in consequence of ulceration and nearly total disappearance of the septum, in the situation of which was an irregularly indurated, ulcerated, slightly elevated ridge, partially covered with red-gray fresh vegetation. On the ventricular aspect of this fused segment was a vegetation  $15 \times 10$  mm. The mitral and other valves were normal. The heart muscle was flabby and brownish in color; on microscopical examination not fatty.

The lungs were normal.

The spleen was 15 cm. long and 10 cm. in breadth. Its contents were soft and dark red in color.

The combined weight of the kidneys was about 12 oz. (340+gms.) Cortex of average thickness. The striæ obscured; organs not firm.

Bile duct. The orifice of the common duct was dilated and contained a plug of thin, pale yellowish mucus, easily displaced. Upon passing a probe into the duct, it entered a sac  $1\frac{1}{2}$  cm. from the orifice, which corresponded to the dilated ductus communis choledochus. A round ulcerated opening 3 mm. in diameter communicated between the lumen of the duodenum and the common duct in its course in the intestinal wall. A sac resulting from the dilatation of the common duct measuring  $2\frac{1}{2}$  cm. in diameter was completely filled with gall-stones of various sizes, the largest being 2 cm. long by  $1\frac{1}{2}$  thick; the smallest not larger than a pea. All were provided with facets. The walls of the dilated common duct were thickened and the surrounding connective tissue very dense and immediately adherent to the adjacent parts. The gall bladder was shrunken to a small sac 2 cm. in length by 2 cm. in breadth. The walls were thickened and it contained a number of gall-stones around which it had contracted. The cystic and hepatic ducts were greatly dilated and contained gallstones; altogether not less than twenty could be felt in the duct. Externally they were deep black in color.

The liver weighed 3 lbs. 11½ oz. (1686.8 gms.); the surface was smooth, mottled greenish and pale yellow in color. Outlines of the lobules were indistinct.

On section the bile ducts appeared moderately dilated. The walls were thickened and the contents yellowish, viscid, and not purulent.

The aorta presented several small atheromatous ulcers.

*CASE II.—History of previous attacks of gallstone colic. For eight months recurring attacks of pain with ague-like paroxysms and intensification of the jaundice. Passage of the gallstone. Recovery.*

N. K., æt. 30 years, a dark, slightly built woman, was admitted to the Montreal General Hospital, November 17, 1879. She had been healthy with the exception of occasional attacks of indigestion. Four years before she had several attacks of cramps in the abdomen. In the middle of September, 1879, they recurred after a wetting. At this time she had vomiting, and the attacks were of such severity that morphia was given hypodermically. Two days after the onset she became deeply jaundiced, the attacks of pain recurred, and the vomiting became very troublesome, but in about two weeks she was able to go to her home, where she remained until November 17. When admitted she was deeply jaundiced, the tongue was furred, she had nausea and looked feeble. She remained in hospital during the winter, and I found her in Ward 23 when I went on duty. During a residence of five and one-half months in hospital her chief symptoms had been: first, jaundice, varying greatly in intensity, sometimes almost disappearing, but recurring again in a few days; second, ague-like paroxysms—chills, fever and sweating—accompanied by severe abdominal pains, coming on at intervals of from three to ten days; third, great impairment of appetite, dyspepsia, frequent vomiting, especially about the time of the paroxysms; fourth, great tenderness in the epigastrium, most marked over the right costal border.

After an interval of a week or ten days—during which the jaundice would diminish, the bile almost entirely disappear from the urine, the fæces become slightly bile-tinged, the appetite improve, and the patient would sit up—the paroxysm would come on, either with a slight chill, not more perhaps than transitory feeling of cold; at others it would be a severe rigor, in which she would shake as if in an ague-fit. This cold stage lasted from fifteen minutes to three or four hours and was followed by great heat of the skin and burning fever, which after continuing for

an hour or two would be followed by a profuse perspiration. The temperature, was usually normal, or even sub-normal, would rise in the attacks, reaching  $102^{\circ}$ - $104^{\circ}$ , subsiding quickly after the paroxysm, and sometimes sinking to  $97^{\circ}$ . The fever rarely persisted for an entire day. Among the concomitant symptoms of these attacks, vomiting with severe gastric pain were the most common. The pain which usually gave indication of onset resembled that of hepatic colic, being epigastric, and radiating to a point beneath her right shoulder blade. It was scarcely ever as agonizing as the pain of ordinary biliary colic but was often severe enough to require morphia. Before and after the attacks the epigastrium was very tender, so much so that she would even complain of the weight of the bed clothes. Vomiting was a marked feature, and usually accompanied the paroxysm. The bowels were moved every day, sometimes two or three motions. The color of the fæces depended on the intensity of the jaundice—light color when the skin was deeply tinted; brownish when the color of the skin was less intense.

For a long time the motions were filtered in the hope of finding gallstones. Invariably after an attack the jaundice deepened, and we could generally tell by her appearance alone whether she had had one. The urine also at this time became deeply bile-tinged. In the intervals the pain subsided, and the nausea and vomiting became less troublesome, but for days she could not take anything but a little biscuit and milk. She usually remained in bed, but during a long interval she would get up and go about the ward. Itching of the skin was occasionally a distressing symptom.

In April I made the following notes:

"Moderate jaundice; nothing special to be seen on inspection of the abdomen; on palpation decided tenderness in the epigastric region, most marked towards the right costal border; no fullness or increased resistance; limit of dullness extends in nipple line from upper border of 6th rib to within half an inch (1.3 cm.) of the margin of the rib; splenic dullness  $2\frac{1}{2}$  inches (6.3 cm.); heart and lungs normal; urine bile-tinged, specific gravity 1020, no albumen; enormous dark, granular, bile-stained casts, some containing epithelial cells; fæces clay-colored, soft and a little offensive; no fever."

Towards the end of April she left the hospital and went to her home at St. Johns, where she was attended by Dr. Robert Howard, who treated her for gallstones, giving large doses of bicarbonate of potash. She had several paroxysms of pain with fever, and the jaundice continued. On June 3, she passed per anum a large round gallstone,

which Dr. Howard kindly sent to me. It weighed 60 grains (3.9 gms.) and measured a little over 1 cm. in diameter. She improved very rapidly after this, the jaundice disappeared, and she recovered her usual health and strength.

CASE III.—*Jaundice of varying intensity through a period of three years, with recurring attacks of pain and intermittent fever. Recovery.*

November 9, 1880, I was asked to see Mrs. S., æt. 55 years, a well-nourished woman, wife of a florist. She had always been healthy and had borne five children. Had been accustomed to work in the garden and in the greenhouses. Her illness began July, 1879, and her physician, Dr. Simpson, gave me the following particulars of the onset and development of the disease.

"In July, 1879, Mrs. S. consulted me at her house for a mild attack of jaundice which she ascribed to having seen a disgusting object which emitted a most offensive odor, causing her to feel sick at her stomach. When a young girl she had an attack of jaundice following a fright. On August 14, I saw her again; the jaundice had deepened and she complained of a dull pain in the region of the liver and general distress. She remained in this state until the morning of the 6th, when she was seized with a severe chill and intense pain below the ribs on the right side, extending into the epigastrium and to the right shoulder. It was increased by pressure and motion, the breathing was hurried and the anxiety of the patient most distressing. A chill of about two hours was followed by high fever, then copious sweating, which stained the sheets a deep yellow color. The liver was distinctly enlarged. The pain gradually abated but the tenderness persisted for several days. All the essential phenomena of jaundice were present. She remained under my care until January, and during this time she had a paroxysm every two or three weeks, varying somewhat in intensity and duration. The pain became less and less. The chill, fever and sweating were invariably present after each attack, and the jaundice deepened. Itching of the skin was a most distressing symptom, preventing sleep and rendering life almost unendurable. For days at a time the stools were strained, but without finding gallstones. The enlargement of the liver disappeared."

During the early part of the year the attacks continued, but during the summer, under homœopathic treatment, the jaundice almost disappeared, and for many weeks she had not a paroxysm. When first I

saw her she was intensely jaundiced and suffered with the most terrible itching of the skin which I have ever witnessed. Warm alkaline baths were ordered with great benefit. One night after a bath she became quite incoherent. On examination her condition was as follows: well-nourished, somewhat stout woman; thick layer of panniculus over the abdomen. She says, however, that she has lost flesh during the last year. The skin has a deep greenish-yellow tint, and is covered with scratches; edge of the liver could not be felt, no tumor evident below the right costal border; she winces when firm pressure is made between the navel and costal margin; area of liver dullness somewhat diminished and the organ is not tender to firm pressure; the splenic dullness is increased, 7 inches in vertical diameter (17.8 cm.); heart and lungs normal; tongue red and indented with the teeth; bowels irregular; stools clay-colored and offensive; urine very dark colored and contained much bile pigment; temperature,  $98.4^{\circ}$ ; appetite poor, can only take soft food. Within a few days the itching disappeared, excepting on the palms of the hands and the soles of the feet. These parts had always been the most troublesome, and the pads at the bases of the fingers were much swollen and tender. By the 15th she was very much better. The jaundice had begun to disappear, but at noon on the 16th she had a very severe paroxysm, the chill lasting nearly two hours, and there was no vomiting with this attack and no special abdominal pain; no change noticed in the hepatic region.

From this time until Christmas day she had seven severe attacks, varying in intensity, five of which followed each other on Fridays. The rigors were most intense in violence, shaking the bed and causing the room to vibrate. Temperature reached from  $103^{\circ}$  to  $104^{\circ}$ . The jaundice intensified after each attack.

After Christmas she improved very much; jaundice almost entirely disappeared and she was able to get up and go about the house. On two occasions she had severe headache and great depression, followed by copious sweating. The palms of the hand continued very tender. A troublesome symptom was the profuse sweating about the waist, sufficient to saturate the under-linen and render it necessary to wear cloths about her. The urine became clear, the fæces contained bile; the liver showed no special alteration. The tenderness on the right side of the epigastrium persisted. During the spring of 1881 the daily amount of the urea was estimated during a period of three weeks, but there was no special diminution during the paroxysm.

I lost sight of Mrs. S. after the spring of 1881, when she was still considerably jaundiced and had paroxysms at prolonged intervals.

On the 7th of July, 1882, she came to see me and stated that her condition had remained unchanged; the paroxysms still recurred at intervals, but she once passed six weeks without one. In May of this year, she had them worse than ever, and to use her own expression, "she was dead of them." After August, 1882, the jaundice disappeared and she now looks in perfect health.

Dr. F. G. Finley, of Montreal, recently (Oct., 1888) made inquiries for me about this patient and writes that she continues well and has had no return of the pain or of the jaundice.

*CASE IV.—Repeated attacks of biliary colic. For three months jaundice with repeated paroxysms, chills, fever and sweats. Operation. Death. Gallstone in common duct.*

Mrs. S., æt. 51 years, patient of Dr. Bolling, of Chestnut Hill. Seen March 2, 1887.

She had been a healthy woman, but since 1862 had several attacks of biliary colic, on one occasion with jaundice. Since Christmas she had pain in the upper part of the abdomen, and very severe jaundice, which has gradually deepened. The urine has been intensely bile-tinted and the fæces colored. For two weeks she had been worse and confined to bed. A special feature had been chills, recurring daily, followed by fever rising to  $103^{\circ}$  and  $104^{\circ}$ , and then copious sweating. The chills were most severe and the fever most pungent. The stools had been carefully examined for gallstones, but without result. The patient was a well-built, well-nourished woman, with intense icterus; tongue coated and dry; pulse 120, small and feeble; no fever; abdomen large; fat abundant; liver dullness not increased. On palpation, nothing to be detected along the costal border in the right hypochondrium; towards the epigastrium great tenderness and distinct sense of increased resistance. A most careful examination failed to reveal the presence of enlargement of the gall bladder. The history of the previous attacks, the persistency of the present one, and the recurrence of intermittent fever pointed clearly to obstruction of the ducts, probably by gallstones. The question of surgical interference was raised, and possible obstruction by malignant disease at the head of the pancreas was also debated.

March 3. The patient was seen at 2 p. m. by Drs. Agnew, J. W. White and Bolling. The condition was worse. The patient was weaker; tongue very dry; abdomen distended; diffuse tenderness, and in the epigastrium extreme sensitiveness to pressure.



Dr. Agnew made an incision between six and seven inches (16 cm.) in length, the outer edge meeting the rectus muscle. When the peritoneal cavity was opened a bile-tinged, slightly turbid fluid escaped. The liver looked very dark, and a conical, pointed gall-bladder projected beyond the edge not more than one inch (2.5 cm.) from the surface, the liver being slightly atrophied above it. On lifting the liver the bladder was seen to be enormously dilated, and by aspiration 18½ (531 gms.) of dark bile were removed. There were no gallstones in it, but a stone was felt low down in the common duct and pushed back into the gall bladder and removed. The head of the pancreas seemed hard and indurated but not enlarged. The patient sank and died twelve hours after the operation. No autopsy was allowed.

*CASE V.—Jaundice of two and a half years' duration. Recurring attacks of intermittent fever, with pain. Operation. Death. Gallstone in the common duct.*

A. B., a woman æt. 40 years, was in the Philadelphia Hospital, September, 1887, when I took charge of the wards. She had been under my care previously, in the spring of 1887, when I was on duty for Mr. Tyson. This had been her third or fourth admission within two years with attacks of pain in the region of the liver, and chills, fever and heavy sweats. My colleagues had on two occasions brought her blood to me for examination, the existence of malaria having been suspected. Once certainly, possibly twice, her liver was aspirated, the recurring chills having aroused a suspicion of abscess.

The patient was a medium-sized, fairly well-nourished woman. She had lived a hard life and had had specific disease. Attacks similar to those from which she at present suffered, came on about two years ago and she had not been entirely free from them for a period of three months, nor does she think that she had in this time ever passed two months without a slight tinge of jaundice. When first seen she was up and about the ward and showed only the slightest lemon-tint of the skin and of the conjunctivæ. The urine was a little high-colored. The stools contained bile. On examination the liver appeared to be enlarged. In the mammary line, the right lobe extended four fingers' breadth below the costal margin; in the median line a distinct irregularity in outline could be made out. The gall-bladder could not be felt. Palpation was not painful. Early in October, she had an attack of violent pain with vomiting and a moderately severe rigor, after which the temperature rose to nearly 104°, and she sweated profusely

the entire paroxysms lasting over twelve hours. The next day she was distinctly jaundiced, free from fever, the tongue heavily coated and the stomach extremely irritable. The urine was very dark, containing bile-pigment and the stools were light colored. The liver did not seem to be larger, but it was sensitive to pressure. The gall bladder could not be felt.

In three or four days the gastric symptoms passed away and she was able to sit up. The jaundice deepened distinctly for three or four days and then gradually lightened.

The case was made a subject of almost daily demonstration in the ward-class, and I confidently predicted a return of the paroxysms. Throughout the winter she had four or five, each similar to the one just described, varying somewhat, however, in intensity.

I had made up my mind from the length of time which the woman had suffered and from the character of the attacks that the case was one of obstruction of the common duct by gallstone; and early in February I asked Dr. White to see her in consultation. The patient consented to an operation, and Dr. White made a free abdominal incision along the line of the costal cartilages. There was extensive perihepatitis with puckering of the edges of the liver, due to the cicatrization of old gummata. The gall-bladder was not enlarged; there was a great deal of fibroid matting of the tissues in the gastro-hepatic omentum. No gallstone could be felt in the gall-bladder, nor in the duct. The patient came out well from under the influence of ether; had no shock, and six hours afterward her temperature and pulse were normal. The following day there was a rise of temperature and she died on the third day after the operation.

I had been so confident, from the history of the case, that it was one of obstruction by gallstones, that I was naturally chagrined at the negative result of the operation. The friends removed the body at once to Jenkintown, but I was fortunately able to secure an autopsy, when the following condition was found:

Perihepatitis with deep puckering, owing to the cicatrization of old gummata. The liver was not enlarged; the apparent increase in size, during life, was due to the tilting forward of the convex surface of the organ. There was recent acute peritonitis, confined to the region above the transverse colon. The liver, stomach and duodenum were removed together for dissection. On slitting open the duodenum, a bile-tinged mucus was seen oozing from the papilla. Projecting into the duodenum and covered by the mucosa only was a gallstone, the size of a marble. It lay entirely within the bowel, quite close to the

narrow orifice of the duct, through which it could be seen after the removal of the mucus. The stone could not be moved up or down, though it had slight play in the dilated pouch at the termination of the duct. The common duct and its main branches were dilated, the former about the size of the index finger. The contents of the duct was a bile-stained mucoid fluid. The cystic duct was wide. The gall-bladder was a little enlarged, but did not contain any stones. The terminal bile-ducts were not dilated. The other organs presented no special change.

CASE VI.—*Jaundice of varying intensity from July, 1887, until August, 1888. Repeated paroxysms of intermittent fever. Death.*

A. B., æt. 70, physician. Family history good; has enjoyed excellent health with the exception of an attack of nervous prostration in 1863. Some years after he got stout and was unable to take proper exercise. He never had a strong digestion and always had to be careful in his diet. He was in his usual health until July, 1887, when he had an attack of jaundice, coming on with severe pain, evidently biliary colic. The jaundice gradually disappeared, but returned in five or six weeks with pains of the same character. The second attack did not last so long, but in December he had a third attack, again associated with pain in the upper portion of the abdomen. Since then he has not been free from the jaundice, which has, however, varied greatly in intensity. About Christmas he had a severe chill, followed by fever and sweats. At intervals of about ten days the paroxysms have returned, and after each one the jaundice deepened. On March 10, when I saw the patient with Dr. Murray Cheston, his condition was as follows: Stout, well-nourished old man; deeply jaundiced; pulse 92, feeble; no fever; skin moist; complained of much itching; tongue coated; abdomen large; panniculus thick; omental fat excessive. On palpation, the edge of the liver not to be felt; dulness diminished, not more than three fingers' breadth in the middle line, and two and one-half inches (6.35 cm) in the nipple line; no tenderness on deepest pressure over the pancreas. The patient was bright mentally. No vomiting had occurred throughout the illness, but there had been attacks of nausea; bowels constipated; stools of the consistency and color of putty. They have not been dark and normal in appearance for months. Urine scanty, deeply bile-tinged.

The night before I saw him he had a very severe chill, lasting one and one-half hours, which was followed by a burning fever and profuse

sweating. He was much prostrated by the attack, and in the morning, as was usual after an attack, the jaundice had deepened and intensified. He was not emaciated, though he said that he had lost flesh, particularly in the limbs, during the past three months. I saw him at intervals of a few weeks for several months. Throughout April he had no chills and was comparatively comfortable, and the jaundice began to lighten. In May he had several very severe paroxysms, in which the temperature reached  $103^{\circ}$ – $104^{\circ}$ . After each one the color became more intensified, and the urine became darker. With some of the chills he had severe abdominal pains, but with others he complained only of a sensation of epigastric distress. Throughout the summer the chills and fever persisted at irregular intervals. In August the jaundice deepened and he died comatose. No autopsy.

CASE VII.—*Jaundice, with attacks of colic of ten (?) years' duration. Under observation for three years, with repeated attacks of intermittent fever, always associated with an increase in the jaundice.*

A. B., æt. 46, single, domestic by occupation, was admitted to the Philadelphia Hospital with fever and jaundice.

There was nothing special in the family history. Ten years ago she had the first attack of jaundice, which came on with pain in the abdomen, particularly on the right side. She was in bed for two weeks. From that date until the present the skin has never been of the normal color, though for weeks the jaundice would be extremely light. During this period she has had repeated attacks of pain in the region of the liver, usually accompanied with vomiting and diarrhœa. In one of these "spells," as she calls them, she was admitted to hospital. She states that for the past ten years she has had on an average three or four of these attacks a year, always associated with chills and fever and with sweats. She has had also what she terms "burning spells," in which she would get very hot but would not sweat.

Inspection. Patient not emaciated. There is a thick layer of fat over the abdomen; the face is fairly plump; she is deeply jaundiced, color of dark, olive-yellow, not the light soft tint of recent icterus. The conjunctivæ are deeply stained. The skin is dry and harsh. There is no eruption, only a few scratches on the back. She complains of intolerable itching. Temperature was  $103^{\circ}$  on admission, but fell to the normal; pulse 100. The abdomen is symmetrical, the upper zone not

especially enlarged. On palpation it was soft, non-resistant and painless until the epigastric and right hypochondriac regions were reached, which on pressure were extremely tender. The edge of the liver can be felt just below the costal margin. The gall bladder is not palpable.

Percussion in mid-sternal line shows not more than two inches (5 cm.) of liver dulness; in nipple line about three inches (7.6 cm.).

The spleen is not palpable. There are three inches of vertical dulness in the axillary line.

She has had several movements of the bowels since admission; the feces are soft and of a grayish-brown color. The urine is high-colored and contains bile-pigment, no albumen.

This patient was under my care on three separate occasions during three years. Each time she was admitted with fever and great pain in the epigastric region, with vomiting and diarrhoea. These attacks usually set in with a heavy chill. The jaundice would gradually get a little lighter, but never completely disappeared. The stools were never quite clay-colored. I urged her repeatedly to submit to an operation, but she would never consent. Twice she was made the subject of a clinic illustrating a form of hepatic intermittent fever, due in all probability to chronic obstruction by gallstones.

CASE VIII.—*Jaundice of ten months' duration, with recurring chills and fever. Recovery.*

Agnes S., æt. 23 years, was admitted to the maternity wards of the Philadelphia Hospital in January, 1886. Her labor was normal and the convalescence uninterrupted. Two months after confinement, she fell across a chair and injured herself severely, causing a profuse hæmorrhage, said to have been uterine. Three days after the accident she had nausea and vomiting, and in the course of a week jaundice developed. When admitted to the medical ward, she was slightly yellow and complained of pain in the epigastrium and of back-ache. The bowels were constipated and the stools of a clay color; they were frequently examined for gallstones, but none were found. A few weeks after the onset of the jaundice—the exact date is not stated in the notes—she began to have febrile attacks, preceded by a chill and followed by profuse sweating. These attacks recurred at irregular intervals. I saw her first in August, in the obstetrical department, and it was then thought that she had either malaria or abscess of the liver. She was repeatedly made the subject of ward-class demonstration as an instance of true hepatic intermittent fever, probably depending upon

gallstones obstructing the common duct. Examination of the liver was negative; the edge could be distinctly felt. The gall-bladder did not seem to be enlarged. There were three inches (7.6 cm.) of vertical liver dullness in the nipple line and the same in the mid-sternal line. The spleen was not palpable. Throughout August, she had four severe chills; after each one the jaundice deepened and each was accompanied by nausea, vomiting and a good deal of pain. In September the paroxysms were less frequent, but she had two distinct rigors, on the 3d and on the 13th. On the 25th, the temperature rose to nearly  $102^{\circ}$ , and she had, for ten days, an irregular intermittent fever. On the 2d, 3d and 4th, there were chills, and she had become at this time more intensely jaundiced than at any period since her admission. She improved between the 5th and the 15th, and the jaundice got lighter. On the latter date she had a heavy chill. Chills recurred on the 22d, 26th and the 28th. In the first twelve days of November she had six rigors; the jaundice again became deeper. After this date she improved very much and through the latter part of November and the early part of December, she was remarkably well and presented only a light lemon tint. She had two or three slight chills, each followed by an increase in the jaundice. On the 27th and 28th, the paroxysms recurred and she again became jaundiced. After January 1st, the color became lighter, and by the 18th, when she went out, the jaundice had almost disappeared. I saw her again more than three months afterwards and the jaundice had completely disappeared and she had no recurrence of the attacks.

Of these eight cases, six were women. Two died after operation; two died from the effects of the long continued jaundice; three recovered after the persistence of the condition for from eight months to three years, and one passed from observation.

In analysing the symptoms associated with these paroxysms, we have

First: *Jaundice*.—This was present in every instance and may be said to have been constant, though varying very greatly in its intensity. It will have been noticed that in every one of the cases the statement occurs that after the paroxysm the jaundice invariably deepened. I do not remember ever to have seen a well-marked paroxysm, with intense rigor and high fever, in which this peculiarity did not occur.

The patients soon learned to recognize it and to expect, as a matter of course, an intensification of the jaundice. With this, the amount of bile-pigment increased in the urine and the stools became more clay-colored. After persisting for a week or ten days, the tint would become lighter until, as in Cases II and VIII, the skin would become, in the intervals, almost normal. The urine, too, would be lighter in color and the stools contain bile. In certain of the cases, I, III and VII, the jaundice for months together was of the most intense grade.

It is possible that cases of intermittent pyrexia may occur without jaundice, owing to chronic obstruction of a main duct in the liver. I have not met with such a case, but Magnin<sup>1</sup> refers to one under Charcot's care.

Second: *Fever*.—This, in well-developed paroxysms, begins with a sharp rigor. I have rarely seen in intermittent fever chills of greater severity. In Case III, in particular, the large, stout woman would, during the rigor, shake the entire room and cause the small, wooden house in which she lived to vibrate. It may be represented, however, only by a sensation of cold, a creeping chill, in contra-distinction to a shaking one. The fever rises suddenly, and may reach from  $103^{\circ}$  to  $105^{\circ}$ . At first dry and pungent, the skin gradually becomes moist, and usually within from two to five hours of the commencement of the rigor the patient is bathed in perspiration. The entire duration of the fever is from six to twelve hours; rarely does it persist for an entire day. Defervescence takes place rapidly when the sweating begins. Although the rule is for the paroxysms to present the usual stages, as here described, there were in each of the cases lesser attacks, often of fever alone or of fever with sweating. Slight rises of temperature without chills also occurred. Sweating was occasionally seen without the fever. In Case III, in particular, local and general sweating was much complained of. The paroxysms occur at irregular intervals, but I have seen them recur daily for a week or ten days. They may present a tertian or a quartan type, and

<sup>1</sup>Loc. cit.

in such cases the diagnosis of ordinary ague may be made. In Case III, the paroxysms recurred for weeks on Friday.

Third: *Pain* of some sort is as a rule present. It may, but certainly does not always, precede the rigor. In some cases it is not at all a striking feature, and the most intense paroxysms may be quite painless or only accompanied by a sense of gastric distress. It may have all the characteristics of genuine hepatic colic, agonizing, griping pain in the liver-region, with the associated symptoms, feeble pulse and clammy skin. In several of the cases the pain was not at all a distressing symptom.

Fourth: *Gastric disturbances*.—Vomiting often precedes or accompanies the attacks, and frequently before its onset the patient complains of loss of appetite or nausea; the tongue becomes furred, and it seemed very often as if a gastric catarrh really initiated the paroxysm.

The condition of the patients in the intervals between the attacks is a point of considerable importance. They are often well enough to resume their work, or in the case of women, to do light household duties. There is not progressive deterioration of health and strength, such as we meet in malignant disease. With the exception of Case I, who had been ill three years, the patients were all well nourished, some of them fat; even Case VII, who had been jaundiced, she said, for ten years, and who to my knowledge had been so for three years, had a very fair layer of panniculus.

Regnard<sup>1</sup> found in one case that the excretion of urea was diminished during the attack. Only in Case III was a careful study of the urea made during the attacks, but no special diminution was found.

*Diagnosis*.—The significance of hepatic intermittent fever cannot be appreciated without taking into account the associated group of symptoms, and when these are present it points clearly to obstruction of the common duct by calculus. The condition of the bile-passages in these cases is one of catarrhal, not suppurative, cholangitis.

Chronic obstruction of the bile-duct, either by stenosis or

<sup>1</sup>Quoted by Charcot, loc. cit.



by gall-stones, may persist for months without inducing this intermittent pyrexia, as illustrated by the following cases :

*Gallstones in the common duct. Chronic jaundice. No fever.*

A man, æt. 77 years, was admitted to Dr. Curtin's ward in the Philadelphia Hospital, suffering with jaundice. He was a weaver by trade and a moderate drinker. He had jaundice on two previous occasions, and had been in the out-ward for several months, having been jaundiced for nearly a year. Careful inquiry from the attendants, and from the man who occupied the next bed, failed to elicit any history of chills or sweating. When admitted to the hospital he had profuse diarrhœa; the abdomen was distended, and evidently there was fluid in the peritoneum; he was extremely feeble; the stools were gray and the urine high-colored and contained bile pigment. He died on the fifth day after his admission.

I made a dissection with Dr. Atlee, and the following conditions were found: Deeply jaundiced; moderate ascites; liver small, surface granular; gall-bladder slightly distended, projecting one inch (2.5cm) beyond the liver margin; the common, hepatic and cystic ducts were greatly dilated. When the duodenum was opened, a nodular body projected beneath the mucous membrane above the bile papilla. This could be felt as a hard body within the head of the pancreas, and was at first thought to be a cancerous mass. A probe was passed through into the orifice of the duct, and on squeezing above the pancreas a bile-stained mucus flowed from the orifice. The nodular mass proved to be a gallstone the size of a cherry firmly impacted into the ampulla of Vater. It could neither be pushed into the common duct nor into the duodenum. A second stone the size of an olive was free in the duct, in which it could be moved up and down. The common duct admitted the index finger, and its main branches in the liver admitted the little finger. The gall-bladder was moderately dilated; contained no stones; the cystic duct was free. The bladder and ducts contained a bile-stained mucus. The liver presented the appearance of ordinary cirrhosis. The kidneys were swollen and bile stained.

That stenosis of the common duct may persist for months, or years, without inducing chills and fever, is illustrated by the following case :

*Stenosis of the common duct. Jaundice of fourteen months' duration. No fever.*

Hannah C., æt. 35 years, admitted to the Montreal General Hospi-

tal, September 25th, 1880, with obstructive jaundice of two months' duration. The attack had followed diarrhoea, and had come on without any pain. She remained under observation for nearly a year. The skin was of olive-green color; the stools clay-colored; the urine dark greenish brown; the liver appeared greatly enlarged, the dulness in the middle line extending four inches (10.2 cm.) from the xiphoid cartilage, four and one-half (11.5 cm.) inches from the sixth interspace, and four inches (10.2 cm.) from the seventh interspace in axillary line. She had frequent severe headaches and occasional attacks of pain, associated usually with vomiting.

The temperature record, which extended over the entire period of her stay, occasionally showed an elevation of two or three degrees, but she never had chills. The liver increased in size, and on May 21, the note was as follows :

"The liver has gradually enlarged until it now fills a large part of the abdomen, extending in the middle line below the navel and in the flank nearly to the crest of the ilium." She died in August, 1881, of gradual asthenia.

*Autopsy.*—There was moderate emaciation. The liver was enlarged but not so much as was expected, owing to its vertical position. The surface was smooth and of a deep olive-green color. The common bile-duct was pervious to a small probe, but the first inch and one half from the orifice it was extremely narrow, the wall darkly pigmented and the lining membrane rough. Above this part the duct was greatly dilated and the walls thickened. The gall bladder was moderately distended; the walls were hypertrophied, and the lining membrane rough and shaggy. It contained three small stones. The hepatic duct and the branches in the liver of the first, second and third dimensions were enormously distended, forming elongated sacculi. The duct passing to the right lobe admitted three fingers with the thumb between them. The lining membrane of the dilated passages was smooth, not ulcerated, not thickened. The dilatation was confined entirely to the branches above named, the terminal branches being little, if at all, affected. There were no dilated ducts to be seen beneath the capsule. The contents of the duct and the gall bladder consisted of clear mucoid fluid. The tissue of the liver was smooth and the acini well marked. There were no cirrhotic changes

These instances show that it is not the obstruction alone which induces the intermittent fever; there must be something superadded, probably the ferment-producing agents, the

micro-organisms, which, as we shall see, have been found in two cases.

From a practical standpoint suppurative cholangitis is the only affection from which gallstones with hepatic intermittent fever is to be differentiated. The post-mortem examination in Cases I and V, and numerous observations which I have found in the literature, show conclusively that the intermittent pyrexia in these long-standing cases is not necessarily associated with suppuration in the ducts. But, unfortunately, suppurative cholangitis is most frequently caused by blocking of the common duct with a stone; and it is important to determine in a given case the onset of suppuration. In deciding this, stress may be laid upon the following points:—(1) increased tenderness in the hepatic region with possibly enlargement of the gall-bladder, as this is a more common event in suppurative cholangitis than in simple obstruction of the duct; (2) the more frequent return of the paroxysms, and in some instances the irregularly remittent character of the fever; (3) the jaundice is not so intense in suppurative cholangitis, and we do not see the remarkable deepening in color after the paroxysms; and (4) the general condition of the patient in the intervals is very different in the two conditions. When suppuration exists there are rarely the prolonged periods of apyrexia, the freedom from distress and the general betterment which we see in cases of simple gallstone obstruction.

There may be, however, the greatest difficulty in deciding, and, after all, in the question of treatment it does not make much difference. I recently dissected a specimen of cholangitis brought to me by my friend Dr. Lainé, of Media, Pa., which was removed from a woman, æt. 76 years, who had had, from June until September, chills, fever and sweating, recurring at irregular intervals, either daily, or every third, fourth or seventh day. The liver was tender; no tumor could be felt; the symptoms were evidently pyæmic, and there was inflammation of the right parotid gland. The chills recurred more frequently, and the temperature is altogether more irregular than in any case of ordinary hepatic intermittent fever which I have seen. The autopsy showed an abscess of the gall blad-

der with sinuses. The cystic duct was blocked firmly with a calculus, and another the size of a cherry lay loose in the common duct, not interrupting the passage of the bile. There were two septic abscesses in the lower lobe of the left lung, and there was fresh endocarditis of the aortic valves.

In the chronic obstruction which results from the compression of a cancerous mass either in the head of the pancreas or secondary in the lymph glands, there are occasionally rigors, due to catarrhal or suppurative cholangitis, but the sequence of the symptoms would, I think, enable one to decide between this condition and gallstones. The varying intensity of the jaundice and the comparatively easy state of the patient in the intervals between the paroxysms are features which I have not met with, nor seen referred to, in the obstruction by malignant growths.

When the fact is recognized that the lodgment of gallstone in the common duct may be associated with pyrexia of intermittent type, a confusion of these cases with malaria is not likely to occur. The mistake is, however, very commonly made, and in at least five of the cases here reported the patients were supposed to have chronic paludism, for which they had taken quinine in large doses. The error is a pardonable one when the patient is seen in the interval between two paroxysms, with very slight jaundice and perhaps not more than the lemon-tint of skin seen in chronic malaria. The history of repeated chills is very likely to mislead, and it may require a careful study before the diagnosis can be established. The negative condition of the blood in these cases may be very suggestive, as in Cases V and VII, in which the absence of Laveran's organisms led to a revision of the diagnosis.

I have no knowledge of the cases referred to by certain writers, in which a calculus in the duct arouses latent malarial influences, and the paroxysm thus results from the combination of the two factors.

*Pathology.*—The pathology of hepatic intermittent fever is obscure. Two views have been advanced. Charcot believes that it is due to the production of a ferment in the bile passages, the absorption of which into the blood excites the feb-

rile paroxysms. A certain measure of support is lent to this view by the discovery in the ducts in a case of cholangitis, by Netter and Martha,<sup>1</sup> of a bacillus similar to one of the intestinal organisms.

It is not only in suppurative cholangitis that organisms occur, since in Case I, in which the bile-ducts, as stated, contained a yellowish viscid, non-purulent material, Dr. Abbott discovered a short pointed bacillus which did not, in cultures of general characters, appear to correspond with the one described by Netter and Martha.

The occurrence of endocarditis, as noted by these authors, is also extremely suggestive of the action of micro-organisms, and the identity of the organisms in the ducts and those on the heart valves was established by Netter and Martha. Altogether the view of Charcot is one which commends itself most strongly to my mind.

On the other hand, Murchison inclines to the belief that the febrile paroxysms are due to the simple irritation of the stone, not to a septicæmia. To this view, Ord subscribes,<sup>2</sup> stating that the paroxysm of fever is "due to local irritation of the mucous membrane propagated to the central nervous system and resulting in pyrexia, mostly in persons apt to take on febrility, and particularly in persons who have previously had intermittent fever."

It was Budd, I think, who drew the analogy between hepatic and urethral fever, but the analogy to which he referred is rather between the rigor in recent cases of renal and hepatic colic and in the so-called catheter fever. There is, however, a renal intermittent fever, closely analogous to the hepatic form. It may occur, first, in tubercular pyelitis; second, in calculus pyelitis; and third, in rare instances of stone in the pelvis, without chronic suppurative pyelitis. The cases in the last category present a curious analogy to hepatic intermittent fever, due to gallstones, and without suppurative cholangitis. There are intense rigors, the temperature rising to 104° and 105°, with great pain in the renal region and distinct changes

<sup>1</sup>Archives de Physiologie, 1886.

<sup>2</sup>Loc. cit.

in the character of the urine. In a case of the kind which I had an opportunity of studying for several months, the paroxysms recurred at intervals of a few weeks; in each one the urine became somewhat turbid but not purulent. No enlargement of the kidney could be detected, but there was decided sensitiveness in the left renal region. In the intervals of the attacks, the patient was perfectly well and the urine became clear.

In all of these cases the obstruction is not complete, as shown by the presence of bile in the stools for long periods at a time. The association of the chills and fever with intensification of the jaundice must be more than accidental. The two must be correlated in some way, in all probability through a transient impaction of the stone in the duct. Such a condition might induce the chill, either through reflex irritation as held by Murchison, or by preventing the escape from the bile passages of toxic ingredients--ferments produced by the action of micro-organisms—which are absorbed in the blood instead of escaping freely into the bowel. The impaction is probably overcome by a gradual increase in the *vis a tergo* until the duct is stretched to a point which permits the calculus to fall back into a wider portion. The pressure may reach such a grade that the stone is forced out, as happened in Case II, and very likely in the other cases in which recovery followed.

I have emphasized sufficiently the important diagnostic indications afforded by the hepatic intermittent fever, and a careful attention to the group of symptoms presented should enable us to determine whether, in a given case, gallstones alone are present, or whether suppuration has supervened, and the important question remains as to the prognosis and the treatment in these cases.

*Prognosis.*—I have been fortunate in the cases which I have seen, as three of them recovered; one after a persistence of the symptoms for three years. Judging from the rarity with which recovery is mentioned in the literature, such cases must be deemed exceptional. The great majority of them follow the course which is sketched in the history of Cases I and VI, death resulting from exhaustion or cholæmia.

*Treatment.*—The remarkable success which has recently been obtained by surgeons, indicates clearly the line of treatment which should be followed, and although the results of opening the common duct have not been so favorable as in cholecystotomy, yet they are sufficiently hopeful to warrant the attempt in every case, either to push the stone into the duodenum, to crush or to extract it.

Of medicinal agents I have not found any of the slightest value, either in preventing the onset of the paroxysm or causing the solution or propulsion of the stone. Certain of the cases were drenched with olive oil, and most of them had taken soda salts and mineral waters. Many, perhaps all, of them had taken quinine in large doses, but it is quite ineffectual, either to control or to prevent the paroxysms.

I have dealt thus at length with this special symptom, or rather symptom-group, so characteristic of obstruction of the common duct by gallstones, as I believe a wider recognition of its importance may be the means of saving valuable lives by timely surgical interference.

#### CONCLUSIONS.

1. Chronic obstruction of the common bile-duct is often accompanied by an intermittent pyrexia, associated with a symptom-group of the greatest diagnostic importance.

2. This pyrexia is not usually the result of suppuration, as has been supposed, but occurs with a catarrhal cholangitis.

3. That it arises from the absorption of a ferment, produced in the ducts, is rendered highly probable by the discovery of micro-organisms, both in the catarrhal (Case I) and in the suppurative cholangitis (Netter and Martha).

4. While recovery may follow, even after months (Cases II and VIII), or even years (Case III), a fatal event is only too common.

5. A recognition of the importance of this intermittent pyrexia and its associated symptom-group, as diagnostic of obstruction of the common duct by gallstones, should, in the present condition of hepatic surgery, lead to more frequent operative interference in these cases.

# RECENT EXPERIENCE IN THE DIAGNOSIS AND TREATMENT OF CRANIAL AND SPINAL INJURIES.<sup>1</sup>

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FOUR CASES OF EXTRADURAL HÆMORRHAGE; ONE CASE OF  
PENETRATING PISTOLSHOT WOUND OF THE CRANIUM;  
TWO CASES OF FRACTURE OF THE BASE OF  
THE CRANIUM; ONE CASE OF  
CEREBRAL HÆMORRHAGE.

THE progress of knowledge in the matter of cerebral localization, and the revival of interest in attempts to institute operative relief in certain cases of injury or disease of the spinal cord, give at the present time a special interest in studies both of disease and injuries of the cranio-spinal skeleton and its contents. For this reason I venture to report in the following paper a limited series of cases of injuries of the cranium and spine which have come under my personal observation during the past year, in the study and treatment of which an attempt was made on my part to utilize the most recent additions to diagnostic means and operative resources. That in most of them a fatal result was not prevented, and in some of them the post-mortem examination was required in order to accurately establish the diagnosis of the character and extent of the injury, is simply acknowledging what is to be expected in such a class of injuries, in which the lesions are often multiple and diffused, and involve the centres of life.

I have to report four cases of extradural hæmorrhage, one

<sup>1</sup>Read before the New York Surgical Society, November 27, 1889.



cranial and three vertebral, all terminating fatally; one penetrating pistolshot wound of the cranium, terminating in recovery, and two fractures of the base of the cranium, one with recovery and one with death. Was this report intended to discuss the general subject of fractures of the base of the cranium yet other cases would have to be included, some of recovery but in which the proof of there having existed a fracture of the base is not absolute, and others of death, but so speedily from the immediate shock of the overwhelming injury as to prevent the development of such special symptoms as might make them of interest in a study of the present character.

#### EXTRADURAL HÆMORRHAGE.

The first case is as follows :

*Linear Fissure of Left Parietal Bone without External Wound ; Laceration of Middle Meningeal Artery ; Extensive Extradural Hæmorrhage ; Death.*

A man, æt. 45 years, was admitted to the Methodist Episcopal Hospital in the afternoon of December 25, 1888, in a condition of profound coma, with the following history: About sixty hours before he had been struck twice on the head with a kind of a wooden mallet, known as a bungstarter. Though felled by the blow, he was afterward able to rise and to walk some distance to his home, with the assistance of two companions. Some nine hours later he was first seen by a physician who found him comatose, but not so deeply but that shaking and sharp speech would rouse him partially. His pupils at the time were both firmly and evenly contracted. Twenty-four hours later the coma was less profound, he had made a voluntary successful effort to urinate, some right-sided paralysis was noted. By the next day, however, the coma had again become profound, for which reason the patient was sent to the hospital. I saw him at 5 P.M., being a few hours after his admission. His pulse was 80, and full; his respirations were 20 per minute, with tendency to snoring; his skin was warm; both pupils were alike and normal in appearance, but did not respond to stimuli; repeated and careful tests of the reflexes and of sensation over the body were unsatisfactory in their results. The patellar reflex seemed somewhat exaggerated on both sides. There was well-marked ankle and wrist clonus. There seemed to be slight paresis of

the right limbs and of the left side of the face, but firm pressure on the supraorbital nerves at the notch in the parietal bone elicited movements of limbs on both sides of the body, most marked on the right. Careful examination of the shaven head by myself and a number of my colleagues of the hospital staff could discover not only no depression or other irregularity to show a lesion of the skull, but there was not even a sign of external bruising apparent to show upon what part of the head the blows had been inflicted.

Here was truly a perplexing case. The man had been the victim of a murderous assault; he was evidently suffering from cerebral compression, the result of intracranial hæmorrhage. The rightsided paralytic symptoms which had been reported as noted on the second day after the injury suggested a lesion over the left hemisphere, but the report as to this symptom was indefinite and uncertain, and was contradicted by the activity of the right-sided movements elicited by supraorbital pressure, and by the normal symmetrical condition of the eyes. He had sustained a blow with a blunt weapon, presumably on the vertex; it was possible that the chief injury had been inflicted upon the opposite side, viz., at the base, and that the hæmorrhage was from one of the vessels in that region. The localizing symptoms were not distinct; I was in doubt; the man's general condition was not apparently immediately threatening; I decided to wait for the development of symptoms that might enable me to more clearly localize the trouble. Directions were given that should any change occur I should be notified at once. It was understood with my colleagues who were in consultation with me that, in default of the development of any distinctly localizing symptoms, if any change for the worse in the general condition of the patient should occur exploratory trephining should at once be instituted at the lower anterior angle of the parietal bone, first on the left side, and if that should be fruitless, on the right side, with a view to ascertaining whether one of the middle meningeal arteries might possibly be the source of the hæmorrhage, and if so, to its proper treatment.

During the immediately succeeding hours there was a gradual change for the worse in the patient; his respirations became slower by degrees and more stertorous until they were only 8 per minute. Œdema of the lungs developed; the pupils became widely dilated, and he died by respiratory failure at five o'clock in the morning, being twelve hours after I had examined him. Meanwhile no message was sent to me as to his condition, and I thus had no opportunity to carry out the plan of exploratory trephining agreed upon in the consultation. This is the

more to be regretted for, had this been done, the revelations of the post-mortem table showed that the source of the hæmorrhage would have been uncovered, and a correct diagnosis at least would have been arrived at before death. Whether the ultimate fatal result would have been changed, I doubt. The autopsy revealed a linear fissure of the left parietal bone, beginning near the vertex, about  $\frac{3}{4}$  inch to the left of the sagittal suture, and about  $1\frac{1}{2}$  inch behind the coronal suture and running downward and forward into the temporal region bisecting the anterior inferior angle of the parietal as far as its articulation with the sphenoid. The lower half of its course involved the groove in which lay the large anterior branch of the middle meningeal artery, which vessel was lacerated causing an immense circumscribed extradural extravasation which had formed a blood-tumour measuring five inches from before backward, four inches from above downward and an inch thick in its centre. This had made a bed for itself by depressing the lateral convexity of the cerebrum, compressing chiefly the lower parietal and upper temporal convolutions. The brain was normal. There was no lesion at the base.

In this case it is evident that I did not give sufficient weight to the symptoms of right-sided paralysis which had been noted by his physician the day before his admission to the hospital. This was the only definite clue which the case presented, and under the circumstances was certainly sufficient to have warranted an exploratory trephining, with the anterior inferior angle of the left parietal bone as the point of election.

In this connection, an observation may be permitted as to the course of operative procedure in cases of extradural hæmatoma of the temporal region. Kronlein's recent memoir<sup>1</sup> on this subject, based upon the study of 280 cases, gives much valuable data upon this point. Kronlein describes four varieties of hæmatomata, arising from rupture of the middle meningeal artery, divisible into two general groups. The first group, diffuse hæmatomata, may extend as an even layer over the inner surface of an entire half of the skull; the second group, by far the most numerous, are circumscribed and lenticular in form, and are capable of subdivision by location into fronto-temporal, parieto-temporal and parieto-occipital, ac-

<sup>1</sup>Deutsch. Zeitschr. f. Chir., Bd. 23, Hft. 3 and 4, March, 1886.

cording to the portions of the cerebrum which they compress. The most frequent forms are the parieto-temporal, situated over the middle cerebral convexity, bounded in front by the edge of the lesser wing of the sphenoid, posteriorly by the free margin of the petrous portion of the temporal, and extending from the region of the foramen spinosum below and upward a variable distance toward the vertex.

It is possible that a given case may present localizing symptoms sufficient to indicate to the surgeon the variety of hæmatoma with which he has to deal, from the cortical areas shown to be affected. In such cases the point at which the trephine shall be applied is indicated with considerable accuracy, but in those far more frequently occurring cases in which by reason of complications involving other areas of the brain, the localizing symptoms are confused, or by reason of the wide extent and mass of the compressing clot, they are held in abeyance, as in my own case, the problem is less simple, and the surgeon must be guided by general principles in his attack. A perforation made in the temporal region, through the anterior inferior angle of the parietal bone, gives access, as Kronlein points out, to the areas of the diffuse, the temporo-parietal and the fronto-temporal hæmatomata, and is, therefore, the point of election for exploratory perforation in all doubtful cases. The location of this point is easily effected. It is from  $1\frac{1}{4}$  to  $1\frac{1}{2}$  inches behind the external angular process of the frontal bone, on a line drawn backward from the superior margin of the orbit parallel with a line drawn from the inferior margin of the orbit to the entrance to the external auditory meatus.

If this first perforation prove fruitless, a parieto-occipital hæmatoma is to be sought for by a second trephine perforation, made in the region of the posterior branches of the middle meningeal artery. The most favorable point for this second perforation is on the same line as the first, prolonged backward, at its intersection with a vertical line carried upward directly behind the mastoid process. A second opening of this sort is advised by Kronlein to be made in case of diffuse hæmatoma to permit the more thorough removal of the coagula,

and to ensure complete drainage. In such a case as my own, this double opening would have been imperative for the adequate relief of the conditions present, and for its subsequent cure. I know of no instance, as yet, where this recommendation has been carried out in practice, but its reasonableness and necessity in certain cases must command the assent of surgeons.

CASE II.—*Dislocation forward of sixth cervical vertebra; extradural hæmorrhage; sudden death.*

A robust young man, æt. 26 years, was brought to the Methodist Episcopal Hospital at 9 A.M., May 16, 1888, with a history of having been found in an empty apartment, in an insensible condition; it was supposed from his surroundings that he had fallen headlong through an open skylight above upon the floor where he was found. Upon admission he was comatose and in profound shock, his temperature reaching only 94.8° F. Examination at that time demonstrated persistent priapism with absence of patellar and scrotal reflexes. By the aid of stimulants and heat reaction was gradually secured, with slow return of consciousness. It was now found that there was complete motor and sensory paralysis of the lower extremities with marked, but not absolute, paralysis of the upper extremities. The pulse improved, with gradual rise of temperature to 100° F. Pain and tenderness in the lower cervical region posteriorly indicated that point as the seat of injury. About twenty hours after admission symptoms of collapse suddenly developed, as manifested by heart failure, rapid, feeble and labored respiration, free sweating and unconsciousness. From this he was rallied, however, and for a few minutes his pulse was again strong and regular, his skin natural and his intellect clear; with equal suddenness a second collapse supervened, the symptoms terminating in death in twenty minutes. The autopsy revealed a dislocation forward of the sixth cervical vertebra, sufficiently to partly occlude the lumen of the spinal canal. A considerable quantity of fluid and clotted blood lay posterior to the cord outside of the dura within the canal, extending both upward and downward for some distance from the point of lesion.

The symptoms are those of recurring hæmorrhage from a lacerated meningeal vessel; held in abeyance by the collapse following the original injury, the clot sealing the vessel was

at last forced aside by the increasing blood pressure attending the establishment of reaction; again checked for a few minutes by the second collapse, the bleeding finally burst through again, with the fatal result recorded. Such a case as this gives no opportunity for surgical interference, although the indications are distinct for trephining the laminæ for relief of the blood pressure, if time for such a procedure could be secured before the occurrence of the fatal catastrophe.

CASE III.—*Fracture of the spine at junction of dorsal and lumbar regions; pulpification of spinal cord; extradural hæmorrhage at site of fracture and in upper dorsal region; rapidly ascending parâplegia; trephining of spinal canal; death.*

A robust man, æt. 35 years, was admitted to the Methodist Episcopal Hospital at 9 A. M., July 10, 1889, having just been injured by the fall of a bank of earth upon his back. A fracture of the spine at the junction of the dorsal and lumbar regions was evident. Total paralysis, sensory and motor, of the lower extremities was present. Pain in the epigastrium and abdomen was complained of. The surface anæsthesia in front reached to within  $2\frac{1}{2}$  inches below the level of the anterior superior iliac spines, corresponding quite accurately to the upper limit of the distribution of the branches of the lumbar plexus. During the next twenty-four hours this area of anæsthesia ascended until it reached the level of the umbilicus. It remained nearly stationary at this point for three days. It then took another jump upward, reaching in twenty-four hours the level of the xiphoid appendix. From this point it continued to creep slowly upward at the rate of about 2 inches each twenty-four hours, so that by the eighth day after the accident the area of anæsthesia had reached a point  $12\frac{1}{2}$  inches above the anterior iliac spinus. Meanwhile the general condition of the patient had been fairly good. His intellect was clear. He had taken food well: his bowels had responded to enemata, and his bladder had been emptied at regular intervals by catheter. Bloody urine indicated some kidney lesion. On the sixth day, however, he had a severe rigor with rise of temperature to  $102.6^{\circ}\text{F}$ . On the eighth day a second rigor with similar rise of temperature occurred. The treatment up to the present time had been purely expectant. Careful examination of the spine did not show any depression of the laminæ or spines at the seat of the fracture. The extent of anæsthesia noticed on admission was

evidently the immediate result of the injury; the extension noticed during the first twenty-four hours was the natural result of the traumatic congestion and effusion of that part of the cord in the immediate vicinity of the original wound. The rapid ascent of the line of anæsthesia on the fifth day, and its steady creeping upward thereafter introduced a new element into the case.

Was it due to a steadily extending inflammatory degeneration of the cord? If so, the teaching of Brown-Sequard that such extending lesion is usually due to the continued irritation of the cord by pieces of broken bone, gave a clear indication for exploratory trephining at the site of the fracture. Was it due to hæmorrhage within the canal, forming a gradually extending hæmatoma, creeping upward with pressure upon the cord as it ascended? Such a theory was plausible and consistent with the symptoms. If so, the indication for operative interference was equally plain.

The change for the worse in the general state of the patient as indicated by the rigors and fever of the sixth and eighth days gave urgency to the indications for interference. I, therefore, on the eighth day, operated as follows: By the usual longitudinal incision in the midline of the back, the lower dorsal and upper lumbar spines were exposed and the gutters on either side were cleared of their muscular contents, so as to expose the laminæ. The line of fracture was through the dorso-lumbar articulation with fracture of spine and laminæ of the last dorsal vertebra, but without depression or displacement. The supra and interspinous ligaments, together with those binding the laminæ together were practically intact. The spines and laminæ of the lower dorsal and of the upper lumbar vertebræ were then removed by means of a rongeur. This exposed a layer of partly organized bloodclot, about a line (or 2 mm.) in thickness, lying external to and upon the dura mater of the cord, and extending downward as far as the canal was opened. The spines and laminæ of two more of the dorsal vertebræ were then removed; the original clot did not extend above the line of fracture. No fresh effusion of blood was revealed. No laceration of the dura was present. Palpation showed the cord to be soft within its sheath. No irritating spiculæ of bone and no effusion of blood in sufficient amount to cause compression symptoms was found. The dura was not opened. The wound was therefore closed. The patient rallied well from the operation. During the following day there was no further extension of the anæsthesia. His bowels moved spontaneously three times. During the next day he began to fail, and finally died by asthenia near its close, being ten days

after the original injury and about thirty-six hours after the operation.

The autopsy showed that the softening of the cord reached upward to the seventh dorsal vertebra ; above this point it was normal. In addition there was a second extradural hæmatoma in the upper dorsal region, extending from the level of the fifth dorsal to that of the seventh cervical. There was a laceration also of the left kidney.

*CASE IV.—Fracture of the spine in the mid-dorsal region: Pulpification of the cord with intra-medullary hæmorrhage; extensive extradural extravasation. Death.*

A robust sailor, æt. 29 years, was admitted to the Methodist Episcopal Hospital, October 1. 1889, on account of injury received by a fall of about 18 feet, striking upon the back of his head, neck and shoulders. He was perfectly conscious, breathing easily, but with total motor and sensory paralysis of both lower and upper extremities. The line of anæsthesia in the trunk was about the level of the second rib, on the arms at the insertion of the deltoid, being alike on both sides. There was marked priapism. A fracture of the spine could be made out in the region of the seventh dorsal vertebra ; pressure over the lower cervical vertebræ elicited deep tenderness ; no displacement. The back was much contused. The case came under the care of my colleague, Dr. Fowler, through whose courtesy I am permitted to embody it in this report. I saw the case with Dr. Fowler shortly after its admission, and shared in the responsibility of the treatment adopted. Immobilisation of the head and upper spine was effected by a plaster-of-Paris cuirass extending from the lumbar region upward above the occiput. Temperature steadily rose from the normal point at which it stood on admission, at the rate of nearly half a degree per hour ; respiration became irregular and catchy, with final death by respiratory failure about twenty-four hours after admission, with a temperature of 109°F. The autopsy demonstrated complete fracture of the spine between the seventh and eighth dorsal vertebræ, with fracture of the laminæ of the seventh and eighth vertebræ, and the spines of the sixth, seventh and eighth dorsal vertebræ, and of the seventh cervical. The spinal cord was pulped at the eighth dorsal vertebra. The extradural space of the upper portion of the spinal canal was filled with coagulated blood. Multiple points of intramedullary hæmorrhage existed in the upper dorsal portion of the cord.

But little encouragement is derivable from these few cases



that I have recited for operative interference in cases of recent traumatism of the spine. I am, however, far from accepting the sweeping condemnation with which Jonathan Hutchinson and Le Gros Clark have declared all such operations unjustifiable. The reasons which prompted me to operate in the one case in which I did interfere, I believe to have been valid and sufficient, notwithstanding the fact that no special benefit accrued to the patient from the attempt. Fractures of the spine, in which the lesion is caused by a force which acts only upon a very limited segment of the column, evidently form a class much more likely to present conditions amenable to operative interference than cases in which the injuring force is more diffused. The injury to the cord will be much more limited in extent; the presence of depressed fragments pressing into or upon a wounded cord is more likely to exist; no extensive resections of the posterior arch of the canal will be required. And those cases in which the bone injury is limited to the spinous processes and laminæ, form a class which should be distinguished clearly, as regards the possibilities of advantage by operative interference from the cases in which there is complete fracture through the bodies of the vertebræ. As is well understood, in many cases of complete fracture—illustrated in the two cases above detailed—the soft structures which bind the bones together posteriorly are not ruptured, and continue to form a most important bond to prevent displacements in the subsequent history of the case. To divide these, as is necessary if the spinal canal is to be opened, entails the destruction of this means of support which can not be adequately substituted, and is a sacrifice which ought to be made with great caution and only on the clearest evidence of the existence of a more imperative indication. This point was impressed upon me by observations that I was able to make in Case 2.

If, however, the bodies are intact, or if the case has progressed to a period in which consolidation of any fracture involving them has occurred, then the posterior arch may be attacked without seriously increasing the hazards of the case.

Gunshot fractures of the vertebræ form yet another class, one in which there is the special indications arising from a

compound fracture probably septicly infected, for immediate enlargement of external wound, removal of fragments of bone, disinfection and drainage.

CASE V.—*Penetrating pistol-shot wound of cranium. Ball lodged within cranial cavity. Drainage. Recovery.*

A man, æt. 43 years, was admitted to the Methodist Episcopal Hospital, July 13, 1889, suffering from a self-inflicted pistol shot wound (32 calibre) in the right temporal region. He was semi-conscious, and suffering considerably from shock. The patient was at once placed upon the operating table and the necessary cares given him by the house-surgeon, Dr. H. W. Cardwell. The whole head was shaven and purified. The wound of entrance was at a point one inch behind, and three inches above the external angle of the eye. The skin wound was freely enlarged with the knife and a corresponding opening in the cranium uncovered, which was found to be surrounded by a thin rim of lead which had been scraped from the bullet in transit. A blunt and light probe gently insinuated into the bullet track, passed into the brain some four inches inward and downward in the direction of the crista galli. A small drainage tube was inserted and gentle injections with boro-salicylic solution were made. An absorbent pad completed the dressing. The subsequent history of the case is comparatively uneventful. Some restlessness and headache for the first two days were succeeded by stupor on the third day which after twenty-four hours more had given way to some delirium. These symptoms with rise of temperature to 101° F., marked the immediate circumscribed traumatic cerebritis along the track of the bullet. After the fourth day, the temperature declined to 100°. Slight discharge of serum mixed with broken down brain matter came away by the drainage tube. On the eighth day the patient in his delirium pulled off the dressings and with them the drainage tube. The tube was not reintroduced. From this date he steadily improved. The external wound healed kindly. By the eleventh day he was quite rational. A tendency to right-sided facial paralysis, with dilatation of right pupil meanwhile had begun to appear which by the fifteenth day was quite marked. On August 13, 23 days after admission, the patient left the hospital recovered. His paresis was diminishing.

CASE VI.—*Fracture of the base of the skull. Recovery.*

A gentleman, æt. 33 years, was brought to the Methodist Episcopal

Hospital, May 5, 1889, in a condition of profound shock, with free hæmorrhage from the left ear, and from the nostrils. He had a few minutes before been thrown from his horse in Prospect Park. He vomited copiously, the vomited matter containing blood. There was no paralysis; all the reflexes were present but diminished in intensity. The discharge of blood and serous fluid from the left ear continued to be copious. He soon fell into a stupor, with alternating paroxysms of delirium. Bichloride irrigations of the left external auditory canal with light tamponade with iodoform gauze were instituted. Stimulants till reaction; then bromides and morphia to control restlessness and delirium.

By the second day notable sensory and muscular paresis of the left side of the face was evident. On the fifth day there were twitchings of the upper lip and right side of the face, with more marked left-sided facial paralysis. On the sixth day there was general skin hyperæsthesia and photophobia. By the ninth day the temperature which had been gradually rising for some days, reached 102° F. There was marked Cheyne-Stokes respiration, and threatening collapse; a bloody discharge from the ear still continues. He rallied, however, from the collapse, and from this time steadily improved. The temperature fell to the normal point. The restlessness and delirium, for a time great, became less marked with lucid intervals, and finally on the twenty-third day after the injury, the patient was discharged from the hospital, still with tendency to incoherence, and with facial paresis unchanged. Entire recovery of mental balance gradually came about after his return home.

CASE VII.—*Fracture of the base of the skull; convulsions; trephining; death.*

A man, æt. 43 years, was brought to the Methodist Episcopal Hospital, May 15, 1889, having sustained an injury to his head by falling from a scaffold. He was wildly delirious and restless, with free bleeding from the right ear. The right side of the face was partially paralyzed, and the right eye was dilated. There was hyperæsthesia of the whole surface of the body. The reflexes in the left side of the body were diminished in activity. There was a small scalp wound in the right temporo-occipital region. Scalp was shaved and the wound explored, but without finding any fracture associated with it. For two days patient's condition remained about the same. The bleeding from the ear was considerable. The restlessness and delirium were controlled by morphia. Urination was involuntary.

At 5:20 A.M. of the third day, patient had a severe convulsion, and continued to have them at short intervals until by noon seventeen paroxysms had occurred. Each paroxysm was identical with the rest. Each began by a deviation of both eyeballs strongly to the left; the whole head then turned to the left; then followed violent convulsive movements of the right orbicularis oculi. Next the left hand exhibited convulsive movements beginning in the thumb, followed by convulsion of all the muscles of the left upper extremity. These lasted for a few seconds. Then all the convulsive movements subsided, then the eyes were strongly deviated to the right. Finally the eyes assumed their natural positions. A period of rest for some minutes would then intervene, after which the same series of convulsive movements would be gone through with again.

No clear indications for attack could be drawn from these irritative symptoms as far as the established facts in cerebral localization were available. The conjugate deviation of the eyes with the deflection of the head to the left indicated cortical irritation in the region of the left middle frontal convolution just anterior to the ascending frontal; but the left hand and forearm movements indicated simultaneous irritation of the cortex of the middle of the right ascending frontal. The convulsions of the right orbicularis oculi, and the final conjugate deviation of both eyes to the right, also indicated a right-sided irritation.

The chief irritation however was evidently upon the right side. The hæmorrhage from the right ear also showed that a line of fracture was running across the middle fossa of the skull on the right side. In reflecting upon the conditions attending fractures of the base of the skull I had previously formulated a plan for instituting drainage of the middle fossa in the earliest stages of meningitis supervening upon such fractures by trephining the temporal bone just above the external auditory meatus. In the present instance it seemed to me that the convulsive symptoms were the result of irritation that was inflammatory in its origin; the primary focus was probably adjacent to the lesion of the temporal bone, and that the peculiar convulsive explosion simply indicated the point to which the inflammatory congestion had progressed. I accordingly determined to open the right middle fossa at the point where it was most accessible just above the external auditory meatus. This I proceeded at once to do. No sooner was the cranial wall exposed by the turning down of a suitable flap than a line of fracture through the squamous portion of the temporal, running inward to the base, became visible. A button of bone adjacent to this fissure was removed. The dura, which was lacerated, was reflected. There now

came into view a cavity of some size, containing blood clot, fluid blood and broken-down brain tissue. Gentle irrigations were used to cleanse this as well as possible. A drainage tube was introduced and the external wound closed.

After the operation the convulsions continued as before to the number of ten; they then ceased. But the coma became gradually more profound. Œdema pulmonum supervened and at the end of nine hours the patient died.

The autopsy revealed in the right temporal lobe beneath the seat of operation a circumscribed area of softening measuring two inches in diameter in the middle of which was a cavity extending on inch inwardly; a thin layer of rather dense blood clot covered the surface of the temporal lobe, with some softening of brain underneath it. Effused underneath the dura mater over the posterior convexity of the right half of the cerebrum, extending as far forward as the anterior frontal convolution, was a thin recent blood clot. There was a blood clot, of less extent, at the base of the right frontal lobe. Into the left convexity of the pia mater there was an effusion of blood, with superficial softening of the cortex of the second temporal convolution over an extent of nearly three inches backward from the fissure of Sylvius.

CASE VIII.—*Cerebral hæmorrhage with symptoms simulating cranial injury; trephining; detection and opening of subdural hæmorrhagic effusion; death.*

A lady, æt. 60 years, was found insensible at the foot of a flight of stairs down which she had evidently fallen. The right clavicle was fractured. Slight bleeding from the right ear indicated at least a fracture of the tympanum on that side. She presented profound coma for the first few hours, gradually becoming lighter, attended with no inequality of the pupils and no paralysis. By the third day conscious intelligence had been regained. During the fourth day complete right hemiplegia developed, with profound coma and collapse. The symptoms were those of intracranial hæmorrhage on the left side. The possibility of the source of this being the middle meningeal artery was sufficiently great to justify in my opinion exploratory trephining in the line of its track. Should the hæmorrhage be from this source, and the pressure symptoms be caused by an increasing extradural clot, the turning out of the clot and the arrest of the hæmorrhage might yet save the patient. Accordingly after turning down a flap of the scalp so as to expose the left temporal region, I applied the trephine at the

point demonstrated by Krönlein, viz., one and a half inch behind the external angular process of the frontal bone on a line drawn backward from the superior margin of the orbit parallel with a line drawn from the inferior margin of the orbit to the entrance to the external auditory meatus. On removing the button of bone the localization of the artery was found to have been exact for its groove bisected the under surface of the button. There was no extradural hæmorrhage revealed however, but the bulging of the dura, with a bluish discoloration, led me to incise the dura, whereby a clot of blood was disclosed. The opening in the cranial wall was now enlarged posteriorly by the removal of another button, and the dural flap turned back over the whole area exposed. An extensive apoplectic effusion was now disclosed consisting of blood clot, fluid blood and broken down brain tissue, its external portion, being the part uncovered, occupying the lower temporal convolutions. The hopelessness of the case was evident and there was nothing left to do, after removing the more superficial portion of the effusion, but to provide for drainage and replace the scalp flaps. No benefit was derived from the operation. The patient was returned to her bed, where she shortly expired by respiratory failure.

The results in these cases are calculated to prevent the indulgence of too sanguine expectations in approaching similar cases. Nevertheless, although, in the great majority of cases, either the extent or the seat of the lesion will render all attempts at surgical relief futile, yet in some cases, intracranial conditions susceptible of relief and cure do exist, and in any case in which a reasonable doubt exists, it seems to me to be justifiable to give the benefit of the doubt to the patient, especially when it is evident that without intervention a fatal termination is certainly imminent.

## EDITORIAL ARTICLES.

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### THE OPERATIVE TREATMENT OF CANCER OF THE RECTUM.

1. ROUTIER. Cancer annulaire de la partie supérieure du rectum; resection par le voie sacrée. Par M. A. ROUTIER (Paris). *Bull. et Mém. de la Soc. de Chirurgie de Paris*, 1889, October–November.

2. STIERLIN. Ueber der operativ Behandlung des Rektum Carcinoms und deren Erfolge. DR. R. STIERLIN (Zurich). *Bruns' Beiträge zur klin. Chirurgie*, 1889, Bd. v, Hft. iii.

3. JESSOP ET AL. Discussion on the Treatment of Cancer of the Rectum in the Surgical Section of the British Medical Association at Leeds, August, 1889. *Brit. Med. Journal*, Aug. 24 and Oct. 12, 1889.

1. In this communication M. Routier reports a case in which he successfully removed four inches of the rectum, which was the seat of an annular carcinoma. The lower border of the growth was about five inches above the external sphincter. The woman was æt. 29 years. Her bowels having been well cleared out by preliminary cathartics, and the rectum having been washed out with a carbolated solution, the operation was done as follows: Right lateral decubitus; incision along the left of the sacral spines from the level of the left posterior iliac spine downward to a point about two inches above the anus; denudation of the coccyx and lower part of the sacrum; disarticulation of the coccyx which was taken away after stripping it of its periosteum from above downward; removal of the first piece of the coccyx, which had remained in place, by a transverse cut with bone forceps; followed by resection of the left inferior angle of the sacrum. The last sacral foramen was not touched. The lower border of the cancer was now accessible. The rectum was now separated from the anterior face of the sacrum easily with the fingers; the separation of the rectum from the vaginal wall was much more difficult, and in the course of this stage,

the peritoneal cul-de-sac was opened, which was at once tamponed with a sponge. The opening of the peritoneum facilitated the pulling down of the intestine. A strong silk ligature was now thrown around the rectum both above and below the growth, and a silk loop was passed through the meso-rectum above to prevent the upper end of the rectum from slipping beyond reach after section had been made. The cancerous part was now cut away with scissors. Both ends of the gut were tamponed with iodoformed cotton. The peritoneal rent was now sutured. The two ends of the rectum were now brought together and sutured by a double row of sutures. A few points of suture were applied to the external wound so as to diminish its extent somewhat, and finally the remaining cavity was stuffed with iodoform gauze.

The after-history was simple. The patient passed gas by the anus the next day; some toxic symptoms necessitated the substitution of salicylated gauze for the iodoform; the bowels moved on the seventh day, the sphincter working perfectly; two days later another stool occasioned the formation of a small fistula which permitted the escape of liquid matter.

The reporter is justly much pleased with the result in this case. He follows its description with some criticisms on the prevailing practice in France in cancers of the rectum. He claims for French surgery the honor of introducing the practice of extirpation of rectal neoplasms lying quite low, the names of Faget (1739), Lisfranc (1826) and Amussat being especially associated with its early history. For various reasons, however, extirpation of even such cases has fallen into disuse to be replaced by such palliative methods as colotomy and rectotomy, to overcome obstruction. Routier is convinced that something more can be done for these cases than is accomplished by these palliative operations which leave the patients suffering either with an artificial anus or with rectal incontinence during the remainder of their lives. In the *Revue de Chirurgie*, for December, 1889, he also returns to this subject by presenting a mass of statistics on the subject. The table compiled by Frank, in the *Dublin Journal Medical Sciences*, Vol. 83, ascribes a mortality of 30% to operations for amputation of the rectum done by the older surgeons. Gross, *System of Surgery*,



gives the mortality as 20% in a total of 193 cases; Ball, out of 175 cases, finds a mortality of 16%, and Cripps puts it at 17% in 76 cases, 23 of which were his own.

The influence of a careful selection of cases is seen, however, in Czerny's experience at Heidelberg, who, out of 43 cases seen, considered only 25 fit subjects for operation, and of these only 1 died.

As to the final results after extirpation, according to Gross, of 154 cases which survived the operation, 51 had a local return, 14 had metastases in other parts of the body, 53 were without return of the trouble at periods varying from 6 months to 10 years, 6 arrived to this late period, 29 had no return for a period of 2 years, 36 were lost sight of after six months.

In Cripps' statistics of 63 surviving cases, 16 were lost sight of, 11 remained cured for a period varying from a few months to several years; 3 were without recurrence after 4 years, and 14 had a relapse between 6 months and 4 years. Of his personal cases, 6 remained cured from 2 to 4 years, and 9 had a return of the trouble in from 4 months to 2 years.

Czerny has 9 cases of cure, 6 of which are over 2 years' standing, and 3 over 3 years.

At the German Surgical Congress of 1888 König gave his personal experience; he had operated on 60 patients, with a mortality of 10%; his results were: without return of the disease after 3 years, 10%; without return of the disease after 2 years, 18%.

Bardenheuer has succeeded in lowering his mortality from 10 to 5%, and cites three women who remained cured after a lapse of 6, 7 and 8 years. These figures show that something better can be done for cancer of the rectum than a simple colotomy or a linear rectotomy.

The operation which is to be chosen for the removal of the new growth varies with its situation.

The great objection to the circular amputation is the removal of the sphincter ani, thus leaving the patient in a condition of fecal incontinence for gases, liquid and semi-liquid substances; nevertheless this is better than a colotomy.

Those cancers which are too low to be removed by laparotomy,

and too high for an extirpation in the usual manner are the ones suitable for Kraske's operation. Certain modifications of the method proposed by Kraske have been proposed. As to the lateral section of the sacrum, Bardenheuer (vid. *ANNALS OF SURGERY*, 1888, vol. VII, p. 137) prefers transverse division of this bone below the third sacral foramen. Schede, in one case, went above this point, but his patient afterward suffered from paralysis of the bladder. Others have suggested a temporary resection, the flaps being devised so that the sacrum would remain adherent to them while they had a pedicle sufficient for their nutrition. (Heinecke, Levy, *ANNALS OF SURGERY*, 1889, December, pp. 445 and 462.)

As to the peritoneum, Kraske proposes a deliberate opening of the peritoneum to facilitate the pulling down of the intestine. Bardenheuer on the contrary, proposes to strip up the peritoneum from the intestine. Most operators open the peritoneum deliberately and tampon it during the rest of the operation with iodoform gauze. Some do not close the peritoneum when the operation is terminated, or close only partially, leaving a drain in the opening. Others close the abdominal cavity by suturing the parietal peritoneum to the serous investment of the intestine; to facilitate this procedure it is necessary to take care to open the cul-de-sac quite close to the intestine.

All operators cut the rectum across, above and below the growth as far as possible from it. Kraske, and many others following his example, slit the posterior wall of the rectum down to the sphincter before making the transverse cut below the cancer. Heinecke even goes so far as to divide the sphincter. As to the management of the two cut ends of the intestine, Kraske has abandoned the complete circular suture, and in order to prevent escape of fecal matters into the peritoneal cavity provides an artificial anus at the level of the line of suture. Heinecke and Hochenegg go farther and suture the upper cut end of the intestine to the cutaneous borders of the sacral incision, reserving the closure of this artificial anus for a later operation. Schede, on the contrary, makes the complete suture, and then establishes a temporary artificial anus in the inguinal region.

All surgeons are agreed as to the manner in which the sacral wound

should be treated. It should be left open and tamponed with iodoform gauze.

M. TERRIER, in commenting on this report of M. Routier, at the meeting of the Paris Surgical Society, reported two cases in which he had removed high lying cancer of the rectum by enlarging the natural passage by linear rectotomy, and by resection of the coccyx.

His first operation was done in December, 1888, upon a man *æt.* 57 years, who was the subject of an annular cancer of the rectum, the lower border of which was about three inches above the anus. The intestine was first disinfected by irrigations of beta naphthol and boracic acid solutions. The patient was placed in the lithotomy position. An incision was then made from the anus to the coccyx, so as to widely open the rectum posteriorly. The healthy parts were then separated from the diseased parts above by a circular incision through the lateral and anterior walls of the intestine. Then above this circular incision the rectal walls were stripped up by fingers and scissors so as to isolate the intestine and bring down the tumor as low as possible. To facilitate this latter proceeding a part of the coccyx had to be resected, the sphincter ani was divided in front and the vesico-rectal fold of the peritoneum was opened. Finally the whole diseased part was cut away with the scissors. The peritoneum was sutured. The upper healthy portion of the rectum was sutured to the lower part with strong catgut. The sphincter was sutured both before and behind; a drain was put in front of the reunited gut, and the external wound was tamponed with iodoform gauze.

The patient recovered rapidly; union between the two parts of the rectum was secured; for some time there was incontinence of feces, but from the tenth day the desire for defecation began to be felt, and the stools became voluntary. Three months and a half after the operation everything was doing well, there was no stricture, but the ano-coccygeal wound was not yet perfectly healed.

His second case was operated in May, 1889. The patient was a lady *æt.* 43 years. The margin of the growth was nearly five inches from the anus and there was considerable infiltration of the adjacent tissues. The same method of operating was pursued except that the sphincter

was not divided in front, and the coccyx was entirely removed. The peritoneal fold was freely opened, the entire diseased tissue was excised little by little, some enlarged glands were removed from the mesentery, and finally the healthy intestine was brought down and fixed in front to the healthy mucous membrane of the anal portion below by catgut sutures. Behind, however, there was not sufficient length of intestine to enable the two parts to be brought together, and therefore the membrane was here attached to the skin. Drains were placed on either side in the ischio-rectal fossæ; iodoform dressings. Portions of the mucous membrane later necrosed in consequence of the tension upon the sutures. Nevertheless the patient was up at the end of a month. The stools were for a long time involuntary, but finally the patient gained control over them and they are painless.

2. The first to plan and perform extirpation for cancer of the rectum was Lisfranc (1822). But the modern revival and extension of the operation is claimed by the Germans.

As a contribution to this subject there are here reported 40 cases observed in the practice of Kronlein, at Zurich, during the years 1881-88 incl. Of these 20 were subjected to radical operation and 13 to colotomy, whilst 7 were not operated.

The later course of these cases Stierlin has been able to follow up carefully:

Recent statistics are quoted showing that in Canton Zurich about 1 death from rectal cancer occurs amongst 300 deaths from all causes, and that of all deaths from cancer  $3\frac{1}{3}\%$  affect the rectum.

Amongst causes of cancer he specifies heredity, as in 5 of his 40 cases it had been observed in other members of the family; usually in the parents and almost always cancers of the stomach. In one case it occurred in 3 continuous generations. This gives  $12\frac{1}{2}\%$ , whilst Schulthess for mammary cancer found 10% Haberlin (1889) for ventricular cancer found 8%, and Heuck for rectal only 4.6%.

Habitual constipation for many years before the appearance of distinct symptoms of rectal cancer was stated in 4 cases (10%), and hæmorrhoids in 6 (15%). One patient had suffered much in youth from prolapsus ani; and on one pæderasty had long been practiced.

Most of these patients were from 40 to 70 years old, averaging 52.2 years (54.4 for males and 50 for females).

The collective statistics of Stierlin, Heuck, Bryant and Hildebrand, amounting in all to over 400 cases of rectal cancer, show that it is about twice as frequent in males as in females.

Histologically, Stierlin's cases were mostly columnar epithelial carcinoma (also 1 alveolar cancer, 2 simple adenomas, 1 suspicious adenoma, 1 very malignant destructive adenoma, 1 cancrroid of the anal portion). The seat of the neoplasm was in 28 cases within the first 8 cm. from the anus (usually 3 to 4 cm.); in 12 it was higher up.

The circular form was present in 70%, the remainder being about equally frequent on front and back wall.

Metastases existed in 5 on admission (omentum, retroperitoneal and inguinal glands, externally on anal border).

*Methods of radical operation.*—The contraindications are first considered. Amongst these the high seat and local extension of the growth no longer play the important part. Adhesions complicate and may forbid the operation, though they are of less account when to the sacral periosteum than when to the prostate vagina, or especially the bladder. In two of his cases a part of the prostate was exsected.

So-called amputation of the rectum was practiced in three cases, and after forcible dilatation of the sphincter in two. Provisional anterior incision was made in one case, posterior sphincter incision in seven, division of posterior rectal wall up to the tumor in six, and resection of the coccyx in one.

The use of the ecraseur thermocautery, etc., is of course condemned.

The indicated operation in the different types of cases he gives as follows:

1. Cancroid of anal portion. Excision of diseased tissues and suture of the healthy mucous membrane.

2. Carcinoma extending circularly upwards from the anus but easily definable. Lispranc's method of amputatio recti, if necessary with posterior incision of the sphincter. Continence is fairly satisfactory after this method, even without a pad; hence it is to be preferred to the sacral method recommended by Hoehenegg.

3. For neoplasms beginning considerably above the anus and extending circularly upwards, whether the upper limit can be felt or not. Kraske's operation is indicated. The sphincter is saved and longitudinal incision of the posterior rectal wall is avoided.

4. For very high-seated carcinoma the sacral method is the only one possible.

5. The indications for limited tumors in the rectal wall are various. When near the anus Simon's forcible dilatation will usually make them accessible. When higher up in the posterior wall Kraske's operation is in place. After exposure of the rectum an ellipse, transverse if possible, is excised from its wall, the edges sutured and the wound drained. Temporary resection of coccyx and sacrum would perhaps be specially indicated here as less space is needed than for a total resection recti. In cases of high seated nodules in the anterior wall a total resection of the gut will be best, or the sacral method must be discarded and the sphincter and perineum divided anteriorly from the anus according to Dieffenbach.

Some of the conditions favoring success in this operation are mentioned. Every patient is subjected to a preparatory course directed to a thorough and complete emptying of the intestines. Fluid diet for 8 to 10 days, laxatives, injections of water and harmless antiseptics (salicylic) the tube being carried well up the bowel. Emptying of the bladder immediately before the operation. The antiseptics of the operation are very important. Especially where the peritoneal cavity is opened success is rare without antiseptics but the rule with them. Carbolic and salicylic acids have here proven uncertain. Sublimate and iodoform have proven best. The former for primary disinfection of wound, in strength of 1 to 2,000 or 3,000 has never caused poisoning in his cases. Iodoform gauze (20%), even when well shaken out before using, has, however, produced toxic symptoms though in his list no death; still its place can not be taken by anything else as yet.

The drainage all agree must be thorough. Strips of iodoform gauze alone or an unperforated tube wrapped in same have proven satisfactory. Instead of permanent irrigation, cleansing once or twice daily with a  $1/50$  or  $1/100\%$  sublimate solution has sufficed. Opiates are

given at first, later laxatives. As soon as drain and sutures are removed and the wound is granulating the patient is bathed once or twice a day. The dressing consists in sublimated wood-wool cushions retained by a T bandage. The peritoneum was injured and immediately sutured in 6 cases, without any bad results. A table of 52 cases of such injury to the peritoneum, 26 treated with suture and 26 without, show 6 deaths in the former to 10 in the latter—all from peritonitis.

Suture of the gut-ends is admissible though very uncertain in the old low operation, and certainly not called for when there is any remaining bridge of mucous tissue. But in the sacral method it is strictly demanded and gives the most ideal cure. In complete circular suture it is well to pass a large drain well up the rectum beyond the sutured spot to avoid fecal stasis.

For operation the patient lies in lithotomy position, unless for the sacral operation when upon the side. His mortality was 2 in 22 radical operations (20 for primary and 2 for recurring growths). Both deaths occurred under carbolic or salicylic antiseptics (one from retro-peritoneal phlegmone and one from delirium tremens). By a comparison of the statistics of many authors he shows that whilst formerly the mortality was about one-half it has been reduced, largely owing to antiseptics, to 5-10%.

*Palliative methods* he divides into two classes: 1, scraping, burning and cauterization of the cancer; 2, colotomy. Between the two stands Verneuil's linear rectotomy. But Stierlin points out that the palliative procedures directly on the cancer itself do not protect it from fecal irritation, and usually have to be repeated. The normal procedure here is colotomy, and he favors with most Germans the intraperitoneal method. Although several exhausted (moribund) patients died within a few days there was only 1 of his 13 that died from the colotomy (gangrenous phlegmon of the abdominal wall). The entire freedom from peritonitis he attributes to strict antiseptics.

The later history of his patients is followed out in detail and considered from various standpoints. The whole duration of the disease in 6 not-operated patients and 2 in which colotomy did not affect their course averaged just one year. This time is shorter than that found

by most observers, though Cripps gives 1 to  $1\frac{1}{2}$  years. His 8 cases of colotomy (2 still alive) gives an average duration of 28.8 months, thus harmonizing fairly with other statistics. Of his 18 radical operations' the later history of which he has been able to follow, 6 are still free from recurrence (1 to 4 years) 2 have recurrence though still alive, and 8 have died (7 from recurrence and 1 from pleurisy). The average whole duration of the disease in 6 who have died of relapses amounts to 32.7 months. He figures out that cases which have remained 3 years after the operation, free from recurrence, may be considered definitely cured. For various reasons a second operation (for recurrence) is rarely of much use. He finds only 2 such cases (Volkman, Turner), in which a cure was finally effected. As a whole, in comparison with other regions of the body, he concludes that radical cures are relatively frequent after extirpation of rectal cancer, and at least the prolongation of life in all suitable cases very well established.

As to the conditions following extirpation recti he gives the results of a recent examination in 8. General condition, digestion, appetite good, increase of weight the rule. Complete control of the rectum (continence) had been regained by 3 (1 forcible dilatation. 1 excision of nodule from posterior wall with incision of latter from below up, 1 typical resection of rectum after Kraske.) Usually a relative continence was present, unless during some attack of diarrhoea. There was complete incontinence in only 1 (high amputation with resection of coccyx). Prolapse of the rectal mucous membrane was present in several, though very annoying in only one. Troublesome stenosis was present in none. Pain in defecation, discharges, hæmorrhage were absent in all that remained free from recurrence. As over 50% recur it is important to know that even then they are largely spared their former troubles, owing to the somewhat different seat and extension (*e. g.*, metastases of internal organs).

The period of after-treatment in his radical cases averaged 84 weeks. It involves much pain and discomfort to the patient.

3. At the fifty-seventh annual meeting of the British Medical Association, held in Leeds, the subject of the treatment of cancer of the rectum was brought before the Section in Surgery for discussion, by



the chairman, T. R. Jessop, of Leeds. Mr. Jessop at first called attention to the fact that there were no medicines which exert a curative effect, but much in the way of palliation can be accomplished by their use. In cases where the upper part of the bowel is involved, he advises the use of laxatives; while astringents should be used where the sphincters are involved, so as to prevent incontinence of fæces.

Operative procedures he considers under two heads; operations for obliteration of the disease, proctectomy, and secondly, those for diverting the fæces from their passage through the rectum, and thus dispensing with the rectum as an active organ. Proctectomy may be done in a few otherwise inoperable cases, where there is partial obstruction.

*Proctectomy* he places among the established surgical procedures. Jessop reports seven cases, with one death, in which he performed the operation. Of the six favorable cases, in three the disease was in the posterior or lateral wall of the rectum, above the sphincter and entirely within reach of the finger. These three patients are alive, one at the end of twenty-one months, and another at seventeen months with no return, while the third had a recurrence at the end of nine months. In a fourth case a recto-vaginal fistula was produced, but this has closed so much that it only occasionally gives trouble; no return of the disease at the end of thirteen months. In the two remaining cases the disease was of a higher level, and in both the growth was removed without much difficulty. In one case the stump was brought down and stitched to the anus, and in the other Douglas' sac was opened, so that here free drainage was used and no sutures introduced; no return at the end of twenty and twenty-six weeks respectively. The death was due to shock. Jessop states that excellent immediate results have been obtained, and that the conditions as regards defecation and local suffering are almost all that can be desired, and are incomparably better than the most exceptional colotomy can effect. These advantages are coupled with the hope of a more or less prolonged immunity from the disease. Hæmorrhage was easily controlled, and the cases without suture did as well as those in which they were used. The rectum should be washed, for several days after operation, every eight hours. Jessop has never preceded the operation by colotomy, but considers this a good measure.

*Colotomy*.—Before discussing this operation he reviews the mode of death in one hundred and two cases, as bearing on the propriety of the procedure. Of these, seventeen died of complete obstruction, unrelieved by operation, and fifteen underwent lumbar colotomy. Thus thirty-two cases, or 31.4%, would have died of obstruction if left to nature. Of the remainder, three died from hæmorrhage, five of acute septicæmia, two from extension to surrounding parts, in nine left lumbar colotomy was done to relieve symptoms other than obstruction, and in fifty-one, just one-half of the whole number, death was the result of exhaustion. The author states, as an important fact, that in none of the thirty-two cases of obstruction was the growth within easy reach of the finger. He believes, therefore, that in cancer of the lower part of the rectum there is not much fear of obstruction, but where the upper portion of the rectum is involved, complete obstruction is sure to come sooner or later. This, he believes to be the result of the anatomical relations, for the lower part of the bowel being fixed, the contraction of the colon above forces the fæces through the constriction, while in the upper portion of the bowel, which is comparatively free, the movements from above are more liable to invaginate the bowel or so displace the growth as to close the opening through it. From this the author concludes that, in cases in which the growth is high up, colotomy should be urged as soon as any symptoms of obstruction appear. He prefers the left lumbar region, as the operation is easily done here, and is sufficiently removed from the growth. In cases low down in the rectum, in which complete obstruction is not likely to occur, and in those where excision is impracticable, he recommends colotomy. From his cases he states that the average duration of life, dating from the first symptoms, in those not operated upon, was seventeen months, while in those who underwent colotomy it was twenty-two and a half months. Again, of the cases operated upon, the average length of life after the operation was fifty-three weeks, while in those in whom operation was recommended and declined, it was only thirty-four weeks; thus, those submitting to operation had life prolonged nineteen weeks. As to the relief of symptoms, complete relief from pain and distress is never obtained, but af-

ter observing his cases, Jessop concludes that the continuous pain is lessened in severity, the almost constant desire to evacuate the bowels disappears in some and is diminished in others; incontinence of fæces is usually absent in colotomized patients, and finally the motions are discharged with ease and regularity.

Mr. Jessop has never performed inguinal colotomy, but has operated one hundred and three times in the lumbar region. He states that he is not entirely satisfied with the latter operation.

MR. MARSH (Birmingham) advocated a preliminary colotomy, after Madelung's method, or colectomy in all cases in which proctectomy was undertaken. He removes the bowel by an oval incision made around the anus and deeply down to the coccyx, and then rapidly detaches the rectum with scissors; hæmorrhage is controlled by pressure.

MR. BANKS (Liverpool) also favored preliminary colotomy or colectomy. He believes the only advantage of inguinal over lumbar colotomy is to render the operation somewhat less difficult; the artificial anus in this region is not taken care of more easily. Banks completely divides the colon and stitches the upper opening of the gut into the wound.

MR. CRIPPS (London) does not consider colotomy and proctectomy rival methods of treatment. Excision is only applicable to a small proportion of the cases of cancer, about 20%, and should not be undertaken if the upper limit of the growth is beyond the reach of the finger, or if the growth has extended to the surrounding organs. He calls attention to the fact that invagination of the bowel at the point of disease may occur as a result of constant straining, and thus an error in the location of the disease be made, as the origin is higher up the bowel than would be supposed from the examination. Of thirty-cases, between the ages of 27 and 76 years, operated upon, he gives a mortality of 7%, one death being from erysipelas and the other from exhaustion. The duration of life in the twenty-eight cases which recovered is as follows: six, no reliable after-history; ten, recurrence within a year; four, recurrence between the first and third years; one died without recurrence a year after operation; one, no recurrence after eighteen months; and six, no recurrence at the end of three months

in one, nearly two years in two, three years in one, four years in one, and nine years in another case. Even in the cases where return takes place the pain is never so severe as with the original growth.

MR. CRIPPS operates with the patient in the lithotomy position and the buttocks raised; a sharp pointed curved bistoury, guided by the finger or speculum, is passed up the bowel, and then, by transfixion, is made to protrude through the skin on a level with the side of the coccyx, the whole of the intervening tissues from this point to the anal margin, being cut through. A crescentic incision is now made, extending from the margin of the first cut to a point in the middle line in front; this cut should extend well into the fat of the ischio-rectal fossa, and if the disease is not too low down, should go through the mucous membrane so as not to interfere with the skin at the anal margin. Dissection is then carried upwards to a point well beyond the seat of the disease; the same is done on the opposite side. A sound in the bladder, in the male, will greatly assist. The bowel is then cut across and is not sutured. The wound is then packed for thirty six hours. After the second week bougies are passed regularly.

Colotomy has had a rather high death rate, being 38% in 110 cases reported by Erckelen and 43% in 60 cases reported by Mr. Bryant. This high mortality depends more upon the delay in operating than upon any dangers in the operation itself. Mr. Cripps reports 14 cases of lumbar and 26 of inguinal colotomy with only one death. This death followed an inguinal colotomy in which the bowel fell back into the abdominal cavity, with extravasation of fæces and peritonitis resulting. Of these forty cases obstruction was partial in thirty-seven and complete in three. Cripps prefers the inguinal region because it gives more room, the bowel is more easily identified, in fat subjects the bowel can be fixed to the skin with less tension, and, lastly, if the bowel should take an abnormal course the operation is not affected as in the lumbar region. The bowel may be opened immediately if necessary.

The incision, made by Mr. Cripps for inguinal colotomy is made at a right angle to an imaginary line drawn from the anterior superior spine to the umbilicus and about two inches internal to the spine. To prevent prolapse, the bowel should be drawn down before suturing.

H. ALLINGHAM (London), said that incision was justifiable only in those cases where there was a small annular growth freely movable, and only when this starts two inches up the rectum, and where the upper limit of the growth can be easily felt. His method of excision, which he claims can be accomplished in fifteen minutes, is as follows: lithotomy position, left forefinger in rectum; a straight bistoury is introduced half an inch behind the rectum, and keeping outside the rectum to a depth of three inches, and the cut made to the coccyx. Next the rectum is divided in the whole of its circumference between the sphincters, then with scissors the tissues, on either side of the bowel, are divided and a careful dissection is made along the anterior wall, up to a point beyond the disease when the rectum is cut across. Colotomy, inguinal preferred, is to be done in those cases where the growth is extensive and causing much pain and also in cases where there is rapidly spreading ulceration.

MR. MAY (Birmingham), reported thirteen inguinal colotomies with but one death and twenty-three lumbar, with five deaths. He strongly recommends the immediate opening of the bowel in the inguinal operation.

MR. JASSETT (Brompton), gave as his opinion that in very few cases should excision be recommended, and then colotomy should be done before the incision. He prefers inguinal colotomy and recommends complete division of the gut and, after suturing the distal end, suturing the proximal end into the wound. He reports five successful cases.

MR. PARKER (Liverpool), reported two cases of excision alive and able to work two and a half years after operation. He would not limit excision to growths low down but would remove coccyx and part of the sacrum if necessary.

MR. MCGILL (Leeds), had substituted colectomy for colotomy in the lumbar region. In two cases in which he did colectomy death resulted from a gangrenous condition developing, as a result of retaining feces in the lower portion of the bowel. He would, therefore, not recommend the operation unless the upper end of the lower portion was left open in the wound.

## INDEX OF SURGICAL PROGRESS.

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### GENERAL SURGERY.

**I. The Influence of Ventilation Upon the Number of Organisms Floating in the Atmosphere.** By DR. R. STERN (Breslau). The author reviews the normal relation of the germs to the atmosphere. These conditions may be summarized as follows:

(1). Except by very strong winds bacteria are never driven off from moist surfaces.

(2). For this reason, only the organisms which are not killed by being dried are found in a living condition suspended in the air.

(3). In general, it is uncommon to find isolated or single organisms in the air. They are usually present in numbers or colonies clustered together upon coarser dust particles.

(4). In still air, because of their higher specific gravity, they quickly gravitate to the surface.

(5). A multiplication of bacteria does not occur in the atmosphere because of the absence of the necessary amount of moisture.

(6). In harmony with the last two facts are the observations of Hesse, Frankland and Petri, namely, that in general the number of organisms present in the air is small. This is especially the case over moist surfaces and in sheltered spaces where the air has been but little agitated.

Bearing in mind these facts, Stern endeavored to arrange his experiments so as to have as nearly normal conditions as possible, but for purposes of accuracy he increased the number of organisms upon which to work to a degree rarely or never found in the air.

A room with four ventilators was selected, two of which brought air to the room and two carried it away. In each case one ventilator for incoming and one for outgoing air were under the ceiling, on opposite

walls, the remaining two being just above the floor. By this arrangement diagonal currents from floor to ceiling (summer ventilation) or from ceiling to floor (winter ventilation) could be produced at will.

He then closed all registers, cracks and openings by which air could enter; thoroughly disinfected walls, floor and ceiling with sublimate solution, and analyzed the air for bacteria. None were found.

His next step was, by aid of an atomizer, to completely fill the air with a mixture of dust and bacteria and determine what effect would be produced upon the number of organisms present in the air by—

- (1). Allowing the air to be perfectly quiet for a given period of time.
- (2). Moderate ventilation (renewal of the whole volume of air 1 to 2 times an hour).
- (3). High degree of ventilation (renewal of air 6 to 7 times an hour).
- (4). Saturation of the air in the room with aqueous vapor.

His conclusions were as follows :

(a). When the air of the room was perfectly still the dust and bacteria sank quickly to the floor.

Where ordinary dust (as from library or school shelves) was employed the air was almost entirely free from bacteria after an interval of one and a half hours.

(b). With ordinary ventilation, that is, a renewal of the air 1 to 3 times an hour, the disappearance of organisms from the atmosphere took place hardly more quickly than when the air was allowed to remain still. When "winter ventilation" was employed, the diminution in the number of organisms was slightly hastened.

(c). An increase in the degree of ventilation increased gradually the rate of disappearance.

The lowest limit of ventilation which caused an appreciable acceleration in the rate of disappearance of the germs from the air was an exchange of from 6 to 7 times an hour of the whole volume of air in the room.

(d). The rapid and complete removal of the germs from the air of a room can be accomplished only by the employment of very strong draughts.

(e). No degree of ventilation, however high, was sufficient to cause

germs to rise from carpets, furniture, clothing, etc., into the air.

(f). Saturation of the air with aqueous vapor is not to be relied upon as a means of depriving the atmosphere of the germs suspended in it. It does, however, to a limited extent, accelerate their disappearance.

In consideration of these conclusions Stern feels justified in recommending as a means of disinfecting rooms which have been occupied by persons suffering from infectious diseases, that as soon as the patient has been removed, the room be closed and allowed to remain so for at least 24 hours, after which it is to be quietly entered and floors, wall surfaces and furniture mopped with cloths saturated in corrosive sublimate 1-1000. Under no consideration is dusting to be countenanced.—*Johns Hopkins Hospital Bull.*, 1889, December, from *Zeitschrift f. Hygiene*, bd. 7, hft. 1.

**II. Upon Catgut Infection.** By DR. C. BRUNNER (Zurich). The essayist, in opening the discussion upon this subject before the Sixty-second Congress of German Naturalists and Physicians at Heidelberg, quoted the published observations and reports obtained from private correspondence of Zweifel, v. Volkmann, Kocher, Neuber, Socin, v. Mosetig, Kappeler and Haffter. The observations of all of these surgeons were carried on with carbolyzed catgut, with the sole exception of Kocher, who, in addition, claimed disturbances of the course of wound healing, attributable to the failure of both juniper oil and corrosive sublimate, in the sterilization of catgut.

In the experimental portion of his work the author of the paper at first tested the condition of catgut derived from manufacturing sources, and found that of these specimens those prepared in sublimate solutions, as well as by Reverdin's dry heat process, were found to be completely sterile, while those prepared with carbolic acid, chromic acid and juniper oil, on the contrary, were capable of serving as means of successful cultivation of both spores and bacteria; among these were observed a non-pathogenic bacillus, which Brunner was not able to identify as belonging to any of the hitherto described forms.

Further the experiments were carried on with the view of determin-



ing the efficiency of the different methods in use for the disinfection of unprepared catgut derived from a known infected source (the small intestine of splenic rabbits) with the following results :

1. After six hours exposure to a 1-1000 solution of mercuric chloride, absolute freedom from susceptibility to germ culture was established.

2. After two hours exposure to dry heat (140 C.) the catgut became absolutely sterile.

3. After thirty-six hours' exposure to juniper oil, the great majority of cultures showed numerous colonies.

4. Preservation in carbolic oil (20-100) after twelve days resulted in a germless condition of the catgut in each instance.

In the discussion which followed, Morian, of Essen, uttered a warning against accepting as proof of the complete sterilization of catgut, the failures to produce cultures therefrom upon artificial pabulum. The animal organism itself offers more favorable conditions for the development of pathogenic germs. He had conducted some experiments with the view of determining some of the questions advanced by the reader of the paper and had succeeded in producing anthrax in mice and rabbits by means of catgut previously infected, and then presumably disinfected as shown by failure of the cultivation tests upon artificial pabulum.—*Centblt. f. Chirg.*, 1889, No. 49.

GEORGE R. FOWLER (Brooklyn).

**III. Bromide of Ethyl as a General Anæsthetic in Dental Surgery.** By Dr. IVAN N. DRAKIN (Kharkov, Russia.) The writer highly recommends bromide of ethyl as a general anæsthetic, eminently suitable for all dental operations of under 15 minutes' duration, the recommendation being based on 200 cases of his own. The substance may be administered from an ordinary inhalatory mask. An average dose necessary for producing narcosis amounts to half an ounce, a complete anæsthesia ensuing within a minute and lasting about 15 minutes. Dr. Drakin claims the following essential advantages for bromide of ethyl in comparison with chloroform and nitrous oxide. 1. While paralyzing pathic sensibility, the Bromide leaves tactile one intact and does not affect consciousness to any considerable degree

("which is of great importance, especially in dental operations"). 2. The pulse and respiration, as well as muscular tone, remain unaltered. 3. Vomiting occurs but very seldom (in 2 out of 200 patients). 4. The recovery from anæsthesia is rapid, easy and spontaneous. 5. The bromide anæsthesia is not accompanied by any unpleasant accessory phenomena (except habitual drinkers and hysterical persons, in whom recovery is followed now and then by some fleeting and slight excitement). 6. No assistants are needed. 7. The bromide is an entirely safe and harmless anæsthetic, provided an absolutely pure drug is used (since injurious preparations are inactive as anæsthetics, but may give rise to disagreeable and even dangerous accessory effects). The author invariably employs Merck's preparation, which is characterized by a neutral reaction, easy volatility, absolute colorlessness and transparency, sweetish taste and an ethereal taste somewhat resembling garlic.—*Novosti Terapii*, 1889, No. 38, p. 202.

**IV. Bromide of Ethyl as a General Anæsthetic in Dental Surgery.** By DR. LEV. M. KHEIFETZ (Odessa, Russia). The perusal of Dr. T. Asch's paper (*Therapeutische Monatshefte*, February, 1888) has induced the author to try bromide of ethyl ( $C_2H_5Br$ ) in 250 consecutive cases of teeth extraction. In all but four cases a chemically pure drug was employed (prepared by Mr. J. O. Kranzfeld, of Odessa, after the so-called French method—that is, by treating bromide of potassium with ethylic alcohol and sulphuric acid, while the ordinary or German method consists in treating bromide of phosphorus ( $PBr_5$ ) by ethylic alcohol), which formed a colorless, transparent, volatile fluid, possessing a neutral reaction, a burning, sweetish taste and a chloroform-like odor (without any garlic flavor). The drug was invariably administered by means of Esmarch's chloroform mask, closely adjusted to the patient's face. The first portion of the anæsthetic was poured over the inner surface of the mask, all subsequent ones over the outer, an average total dose in individual cases being about half an ounce. A complete analgesia always ensued in from  $2\frac{1}{2}$  to 3 minutes. As a rule, the patient's consciousness remained unaffected, but still fairly many subjects became totally unconscious. In none of

the 246 cases where Kranzfeld's pure preparation was employed, any slightest disagreeable accessory effects could be noticed, though frequently the anæsthesia was to be made immediately after the patient's meals. In the remaining four cases, however, in which some commercial articles had been used, there were observed such after effects as nausea, vomiting (in one case persisting for four hours), diarrhœa and cough; besides, the drug imparted a repulsive garlic odor to the patient's breath (which was invariably absent when the pure bromide had been inhaled), while the quantity necessary for inducing analgesia proved to be as large as one ounce. Dr. Kheifetz's general conclusion is to the effect that bromide of ethyl (provided a chemically pure substance is employed) forms an excellent, safe and convenient general anæsthetic in dental operations, no special or extensive appliances or any assistants being required. The author further resorted to a general bromide analgesia in two cases of panaritium and periproctitis treated by incision; and to a local one (by means of Richardson's pulverizator) in a case of extirpation of incarnated toe-nail with consecutive thermo-cauterization. In all the three patients the results left nothing to be desired.—*Meditzinskoie Obozrenie*, No. 13, 1889, pp. 64-67.

VALERIUS IDELSON (Berne).

## HEAD AND NECK.

**I. Temporary Resection of the Cranial Wall as a Substitute for Trephining.** By Dr. W. WAGNER (Konigshutte). The operation of trephining, as practiced to-day, except when done for compound fractures and caries, has the disadvantage of leaving the patient with an opening in the skull, which, although in most cases it is well closed by a mass of cicatricial tissue, still frequently compels the patient to wear an artificial protector. To overcome this unfortunate accident, surgeons have more or less successfully practiced the transplantation of the excised disk of bone, or of disks of bone taken from animals.

The writer has for a long time experimented on the cadaver with a method which permits the temporary resection of large portions of

bone, which can be removed from the opening in the skull but yet remain attached to the soft parts so that on replacement a healing in position is assured.

Wagner proceeds in the following manner: An incision in the shape of the Greek omega is made through the soft parts down to the periosteum, and if these have retracted, the periosteum is divided in the same manner, along their border. The bone is then chiseled through along the line of the periosteal incision, then the bridge of bone at the base of the omega is divided subcutaneously with a small chisel, care being taken not to injure the soft parts.

The excised bone is gently lifted out of its situation with elevators — retracted with its coverings, which remain attached to the surrounding soft parts by a pedicle or base at least 3 cm. wide, thus insuring proper nutrition.

After the operation the flap is returned to its proper position, the pericranial and skin flap carefully sutured, and fine drainage tubes inserted at the angles at the base of the wound. The piece of bone always fits perfectly in the piece from which it was removed, especially if the rough edge of the internal lamella which usually remain attached to the borders of the defect are not chiseled away, and they will also prevent any possible depression of the fragment.

Wagner had the opportunity to try his method in one case and found it as easy of execution on the living as on the dead. The case was that of a man who had sustained a fracture of the base of the skull with rupture of the left middle meningeal artery. The operation was undertaken 60 hours after the accident to relieve the pressure symptoms caused by the clot. The operation was carried out as described above, and seemed to work perfectly, giving plenty of room. Extensive fracture of skull and severe brain injury was found. The patient died 24 hours later. The autopsy showed the flap of bone and soft parts to be in a perfectly healthy condition.

Wagner further says that instead of a chisel, a number of small circular saws worked by a motor, might be used to remove the piece of bone, but though lessening the shock from repeated hammering, it would not leave the serrated irregular edges which contribute to hold

the piece of bone in position and prevent its becoming depressed.—*Centlb. f. Chirg.*, No. 47, 1889.

**II. Tetany Following the Extirpation of Goitre.** By DR. A. VON EISELBERG (Vienna). The neurosis known as tetany, first noticed by Billroth as a sequel to total extirpation of the thyroid gland, is very dangerous, in that respect differing from the other trouble which goes under the same name.

In 12 cases observed at Billroth's clinic mostly women, eight ended fatally, and those twelve cases are 23% of all his cases of total extirpation of the thyroid gland. Two cases became chronic. Neither a previous nervous predisposition nor the healing of the wound, nor a wounding of the recurrent nerve can explain the condition. In seven cases there was, besides the ordinary characteristic symptoms, an involvement of the muscles of the face, neck, larynx, diaphragm and abdomen, so that dyspnoea and even loss of consciousness occurred.

In the two above mentioned chronic cases in which the disease had lasted respectively 6 and 9 years, the attacks were more frequent in cold damp weather.

In the fatal cases death occurred in from 3 to 30 days, and in one case after 7 months.

The proof that only total extirpation of the thyroid gland causes tetany is furnished according to the reporter, by the following facts:

1. That in 53 total extirpations, the disease followed in 12 cases and after 109 partial operations it was never observed.
2. From the results of experiments on animals made by Schiff, Wagner, Horsley and others.

As a result of over 100 operations on the thyroid practiced on cats, Eiselberg came to the following conclusions:

1. The one-sided total extirpation always causes fatal tetany. Neither can the previous or subsequent transplantation of the thyroid gland of another, or of the same cat, nor the injections of thyroid fluid, nor the administration of opiates prevent the occurrence of the disease.
2. Partial extirpation never causes tetanic symptoms.
3. Double-sided total extirpation causes fatal tetany, which never-

theless only appears after extirpation of the second half. In two cases it was possible to transplant the first half in the mesentery in one case and in the other between the muscles of the abdomen and the peritoneum, and thus preventing the trouble.

4. Removal of four-fifths of the gland always causes tetany, though it may not be fatal.

5. Attempt at shelling out the gland by ligature of all the structures going to it, always produced a tetany which was fatal to most of the animals.

These results, agree with those of most observers, and are directed against the theory of Munk, who says the gland is a useless organ and that tetany is due to the irritation which the healing of the wound sets up in the neighboring organs.

A comparison of human tetany following extirpation of the thyroid gland with that seen in carnivorous animals, shows identical symptoms. Von Eiselberg recalled in this connection that the cachexia strumipriva and myxœdema presented analogous phenomena in the tetany of monkeys, and that in these animals an increase of mucine was found in the tissues. And he argues with Horsley that the function of the thyroid is to render mucinoid substances innocuous, as proved by the experiments of Wagner, who succeeded by injections of mucine in producing tetany in healthy cats. The apparently inconstant sequelæ of total extirpation of the thyroid in man, sometimes tetany, sometimes cachexia and sometimes neither, Eiselberg attempts to explain on the following grounds:

1. That in man, contrary to animals, the operation is done for a pathologically altered gland.

2. That an accessory thyroid is more common than was supposed.

3. That notwithstanding total extirpation the disease returned in 7 cases and 4 of the 53 total extirpations at Billroth's clinic, only 11 patients were positively known to have withstood this operation without subsequent symptoms for a long period of time.

Eiselberg concludes that it is the duty of the surgeon to abstain from total extirpation of the gland at any price. There are a number of excellent methods of operation for the partial removal of this organ, the

best of which is the intra-glandular shelling out of the diseased nodules as proposed by Socin.—*Centlb. f. Chirg.*, No. 49, 1889.

F. C. HUSSON (New York).

## CHEST AND ABDOMEN.

### I. Eight Cases of Appendicitis Treated by Early Operation. By Dr. A. WORCESTER (Waltham, Mass.).

CASE I.—A healthy woman in the prime of life. Has been subject to attacks of "colic." On January 6, 1889, the pain began in the morning and increased through the day. Her evening temperature was normal. There was tenderness on pressure, but no evidence of tumor in the right iliac lumbar region. The next day there was more pain, and the evening temperature was 99°. After a fairly good night, her temperature was 100°. Micturition difficult. Severe pain in vagina and in right abdomen, which was slightly distended and very tender. There was no dulness on percussion, and only a slight resistance on pressure. *Per vaginam* the uterus was found slightly pushed to the left and exquisitely painful if moved by the finger. Rectal examination negative.

Operation fifty-four hours after initial symptoms. Incision three inches long in the right linea semilunaris. A few ounces of turbid inodorous serum escaped. The swollen appendix was easily found and drawn outside. Its tip was gangrenous. Owing to the firmness of the adhesions binding down the cæcum, it was very difficult after amputating the appendix to approximate the peritoneal surfaces of its stump. Silk sutures were employed. The abdomen was flushed with hot boiled water, and the wound closed with silk-worm gut sutures. She rallied fairly well, but for five days could keep nothing in the stomach. Peptonized enemata kept her alive. The temperature for the first week was normal. The troublesome distension of the abdomen was relieved by turpentine enemata and use of rectal tube. During the second week the stitches were removed and there was a slight discharge of thin odorless pus. On the twelfth day there was discharged from the sinus a silk ligature which had been left in by oversight; and

a week afterward the silk sutures which had been used on the stump were also discharged. Recovery perfect.

CASE II.—Male, æt. 40 years; when first seen had had pain in right abdomen for nine days and had been confined to his bed for three days. He had vomited frequently. His abdomen was moderately distended, tympanitic except in right iliac lumbar region where there was a well-marked tumor. Pulse, 90, temperature, 100.6°. He was at once removed to the hospital for operation.

Incision three inches long in the right linea semilunaris. The omentum was adherent to the peritoneum. On breaking through it there escaped a pint or more of clear fluid. The appendix was found after long search, delayed by the swollen adhesions in its neighborhood. It was swollen, grayish and perforated. After amputation, the peritoneal surfaces of the stump were approximated by catgut sutures. Abdomen flushed with hot boiled water. Wound entirely closed with silkworm gut sutures.

He rallied well from the effects of the operation, but began hiccupping the next day. This continued for several days and was relieved only by amyl nitrate inhalations. On the fourth day, the wound looking badly, one stitch was removed. Foul pus escaped. Two days after, all the stitches were removed. The edges of the wound were then sloughing. During the second week the wound became healthy and the edges were drawn together with adhesive plaster. At the end of the third week he was discharged well, except for granulating sinus. Contrary to advice he began working too soon, tramping over rough country several miles sometimes. Two months after his discharge he was readmitted to the hospital with a supposed abscess of the liver. He was expectorating, vomiting and also voiding per rectum pus very freely. His condition seemed desperate.

He gradually rallied. The expectoration of pus ceased. In a month he was again at work, and has since, so far as is known, continued well.

CASE III.—A strong, healthy male, æt. 30 years. From boyhood had been subject to occasional attacks of severe "colic." On June 1, 1889, worked hard all day, lifting more than usual. He was taken



sick that night; pains in belly not relieved by vomiting. When seen the next day, he complained of severe pain in the umbilical region. There was no tenderness on pressure nor dulness on percussion in any part of the abdomen. Pulse 74, temperature normal. The next morning the pulse was 80, temperature 99.8°. There was retention of urine. The pain was more severe and was now referred to the right abdomen. There was slight dulness and considerable tenderness in the right lumbar region. That evening his pulse was 90, temperature, 102°. The pain was now definitely located in the region just described, and above the crest of the ilium there was marked dulness and great tenderness. Rectal examination negative.

On June 4, sixty-sixth ours after initial symptoms, the patient having been removed to the hospital, underwent operation. Incision through abdominal walls two and one half inches, in the right linea semilunaris. Exactly where the pain and tenderness had been most marked was found the rigid appendix lying along the outer side of the colon, pointing upward and outward. Delicate adhesions connected its mesentery with the colon and a neighboring coil of the small intestine. The appendix was easily brought outside. It was four inches long, gangrenous in its distal half. Its mesentery extended nearly to its tip. This was ligatured with catgut, and the appendix, having been cut loose from it, was amputated by a V-shaped incision. The flaps of the stump were then rolled in and their peritoneal surfaces approximated by fine silk sutures. Abdominal cavity washed out with hot boiled water. Wound closed with silkworm gut sutures. No collapse followed.

The next day his temperature was normal. The second day his bowels were moved by salts and enemata. He was free from pain and fever for five days. His wound had then entirely closed. But an abscess developed where the appendix had lain, which was evacuated on the ninth day by reopening the wound. Discharged from the hospital on the twenty-fourth day. Recovery complete.

CASE IV.—A healthy boy, æt. 13 years, was feverish the night of June 12, 1889. The next morning he vomited and complained of pain in abdomen, especially on the right. There was frequent vomit-

ing and increasing pain for the following forty-eight hours. When first seen, fifty-six hours after initial symptoms, the abdomen was distended and exquisitely tender. Examination under anæsthesia developed distinct dulness on percussion and decided resistance on pressure in the right iliac lumbar region. He was at once removed to the hospital for operation.

Incision three inches in the right linea semilunaris. Pus escaped on opening the abdomen. A sloughing friable mass presented, which was found to be of omentum wrapped around the appendix. The peritoneal investment of the cæcum and several inches of the colon on its outer surface was sloughing, but the muscular wall of the bowel seemed healthy. The proximal third of the appendix was intensely red and swollen. The distal two-thirds was gangrenous, and at the beginning of this portion were several concretions the size of a pea, retained in the appendix only by its greatly thinned and perforated walls. The appendix was amputated beyond, a catgut ligature applied near its base. The sloughing omentum was also amputated, after ligaturing it in several sections. The abdomen was thoroughly flushed out with hot boiled water. A drainage tube was employed.

Patient rallied well. The next day was very comfortable. There was, however, an offensive discharge from the tube, and on the second day the wound had to be reopened; its surface was black and sloughing. On the fourth day intestines protruded. For three weeks his temperature ranged from  $99^{\circ}$  to  $103^{\circ}$ . His abdomen was greatly distended. He suffered great pain. The discharge from the wound was copious and offensive. When this fæcal discharge ceased, the boy nearly died of intestinal obstruction, which was finally relieved by dilating the sinus and opening an inflated coil of the intestine. A large evacuation of gas and liquid fæces occurred. The patient's condition greatly improved and natural evacuations of the bowels were established. But the constant acrid fæcal discharge from the wound irritated it and the surrounding skin most torturingly.

The convalescence was very tedious. An attempt to close the fistula failed. But now at the end of five months, although there is still some fæcal discharge from the sinus, the boy is able to walk out of doors and is in very good general health.

CASE V.—A large healthy lad, æt. 16 years, has had during last few years occasional attacks of “belly-ache.” On June 13, 1889, was struck by a baseball in region of umbilicus. He thought little of the blow till the next day, when there developed loss of appetite and nausea. That night and the next day he vomited bile frequently, and when first seen by the writer on the afternoon of the 15th, he complained of the same pain that he had suffered when struck by the ball. He was wandering about out of doors. His pulse was 110, temperature 102°. Abdomen soft and not tender on pressure. June 16, temperature 101°, vomiting less. June 17, temperature 100°, slight tenderness in right abdomen. June 18, temperature 99°, increased tenderness and some pain. During the three days following, his temperature rose steadily to 102°. The pain did not increase, but the tenderness and resistance on pressure and dulness on percussion became more marked. Rectal examination negative. The diagnosis of appendicitis was not assented to by consultants till June 20, and the operation then advised was not allowed by his parents till June 21, when he was removed to the hospital.

Incision two and one-half inches in right linea semilunaris. In the iliac fossa was found a dense mass, from which escaped several ounces of foul pus, on pushing into it with the finger. In the abscess cavity (which was poorly defined, and extended upward alongside the colon into the loin) lay the gangrenous perforated appendix on the inner side of the cæcum and pointing downward.

In attempting to lift it into view, three inches of it tore off. It was not possible to move the cæcum so as to get at the appendix stump. After amputating some of the gangrenous friable omentum, which had served as part of the abscess wall, and thoroughly washing out the abdomen, a drainage tube was left in the abscess cavity where the appendix had lain, and a second tube carried up into the loin. The abdominal wound was sutured with silkworm gut.

During the operation the patient suffered considerable collapse. The next day his temperature was 100°, and pulse 140. There was very little discharge from the drainage tubes. The second day his temperature was 102°, pulse 160; delirious. The third day he died. There

was no autopsy. But on removing the drainage tubes there escaped thick, dark, foul pus.

CASE VI.—A healthy boy, æt. 15 years, was taken suddenly sick August 4, 1889, with severe pain in the abdomen. Six years before was confined to his bed for a month with pain in belly and inability to move his right leg. When first seen by the writer, on fifth day of present attack, his temperature was  $103^{\circ}$ , pulse 114. The belly was distended, but not so as to obscure a tumor in the right, which was dull on percussion and very tender. Rectal examination negative. He was removed to the hospital, and operated upon at 9 P.M., August 8. The incision, two inches long, parallel to the crest of the ilium and one inch removed, most happily avoided a loop of intestine which was found firmly adherent to the abdominal wall only a half inch toward the median line. The cæcum and the ascending colon, packed with fæces, was bound down in the iliac fossa, and pulsated with the iliac artery. To the outside of it, and above the crest of the ilium was found an abscess from which was evacuated about two ounces of very foul pus. No trace of the appendix was discovered. After thorough irrigation with hot boiled water, a drainage tube was carried into the abscess cavity and the wound otherwise closed with silkworm gut sutures. For some days after there was a slight discharge of serous pus, never foul, from the tube, which was removed on the sixth day. On the second day there was considerable pain, which was entirely relieved on moving the bowels by salts and copious enemata. The highest temperature after the operation was  $100.2^{\circ}$  on the first day, and never above  $99^{\circ}$ , thereafter. Discharged from the hospital on the twelfth day. The sinus, where the drainage tube lay, closed a fortnight afterward, and at the end of a month the boy was as well as ever.

CASE VII.—A very strong laborer, æt. 30 years, was in the hospital for a week in December, 1888. He had then every symptom of appendicitis, but was not operated upon because from his entrance he steadily improved under medical treatment. He had had two similar though less severe attacks before. For ten months after he was perfectly well.

Soon after midnight, October 11, he was seized with intense pain in the right iliac lumbar region. His pulse at 4 A.M. was 88, temperature 98.8°. At 4 P.M. his pulse was 110, temperature 102°. He was then removed to the hospital. The next morning his fever had not abated. There was great tenderness and pain, but little dulness and no tumor, in region above described. Examination per rectum negative.

Operation thirty-six hours after initial symptoms, by Dr. H.A. Wood. Incision two and one-half inches along outer border of right rectus. Purulent fluid escaped on opening the peritoneum. Intestines coated with lymph flakes. The appendix was found fastened down to a mass of inflamed omentum along the outer side of the cæcum and colon. It was probably perforated, for a small soft faecal concretion was found near it. On account of the firm adhesions and the proximity of apparently healthy omentum the appendix was removed. A rubber drainage tube was placed next it and a second tube left in to drain the pelvis where was found considerable free pus. After flushing out with hot water, the wound was closed with silkworm gut sutures.

Very little shock. No vomiting. The second day after the operation he took liquid nourishment freely. The third day his bowels were moved by salts and enemata. There was very little pain and all went well for six days, when he again became feverish and suffered more pain in the region of the wound. The discharge, which was at first inodorous, became foul. A sub-peritoneal abscess which formed alongside the wound was thought to have been occasioned by infection from the drainage tubes after shortening them, thus bringing the holes of the tubes against the sides of the wound. The tubes and sutures were removed on the eleventh day, and thereafter the convalescence was uninterrupted. Discharged on the twenty-fifth day with only small sinuses where the tubes lay. A fortnight later was walking about town as usual.

CASE VIII.—Previously healthy man, æt. 22 years, was seized with pain in the right iliac lumbar region at noontime, October 29, 1889. He vomited frequently. The next morning there was pain, tenderness and dulness in the region above described. Pulse 80, temperature 96.6°. The next day his condition was unchanged, but there was

more pain that night. The third day his pulse was 100, temperature 103.6°. He was then removed to the hospital for operation.

Incision two and one-half inches along outer border of right rectus. A small amount of pus escaped on opening the peritoneum. The appendix was easily liberated from adhesions binding it to the cæcum. The omentum attached to it was amputated after ligaturing it in sections with catgut. One and one-half inches of the distal portion of the appendix was gangrenous. It was amputated and the stump ligatured with catgut. After flushing out the abdomen with hot boiled water and laying a drainage tube from where the appendix had lain the wound was closed with silkworm gut sutures. No shock followed the operation. His pulse the next day was 88, and temperature 99.2°. There was slight discharge of pus from the tube.

The second day he had more fever and vomited frequently. The edges of the wound becoming œdematous several sutures were removed. The discharge of pus was then more free, and his general condition much improved. On the eighth day the remaining sutures and the tubes were removed.

Except for the necessity of being catheterized for a week or so, and for a small hard swelling in the abdominal wall below the wound which disappeared spontaneously, his convalescence was uninterrupted. He was discharged entirely well on the twenty-fifth day after the operation. —*Boston Med. and Surg. Jour.*, January 30, 1890.

**II. Twenty-Six Cases of Appendicitis.** By Dr. JOHN HOMANS (Boston). Sixteen of these twenty-six cases occurred in adults and ten in youths. Twenty were in males and six in females. Fifteen recovered and eleven died. Twelve were operated upon and fourteen were not, but in all the eleven fatal cases an early thorough operation would have been proper. Of the twelve operated upon six recovered and six died. Of the fourteen not operated upon nine recovered and five died. The average age of the adults was about thirty-two and that of the youths about twelve. The operation was done on the second day in one case, on the fourth day in one case, on the sixth day in one case, on the seventh day in one case, on the eighth day in four

cases, on the twenty-first day in two cases, on the twenty-sixth day in one case, twenty-seventh day in one case. At least three of the operations were not sufficiently thorough.

The cases varied greatly in their severity and in their course. Some of them went on slowly to recovery, some more rapidly, some developed at once a violent local peritonitis, followed later by a general one, some developed an abscess which slowly increased in size in the right flank, others, one which formed more rapidly and formed a swelling more or less prominent in the anterior lumbar, iliac, or pubic region, some gravitate toward the pelvis and perforate the rectum and occasionally, as is shown in case No. 3, the bladder. The most favorable cases for operation are those that have been going on for about a fortnight and where the dulness and flatness or even prominence are well marked and the existence of an abscess is evident. The seat of incision, provided it be into the abscess, so that it can be drained, is not a matter of importance. In regard to removing or not removing the appendix, the majority of successful operations have mostly dealt with the abscess, but where the appendix can be easily found, it is better to remove it. Some cases start in with a gangrenous appendix, a furious peritonitis and run their fatal course unaffected by any efforts. The experience of different practitioners varies very much. No absolute rule can be laid down as a guide always whether any given case ought to be operated upon at the outset or not; but, given an acute and sudden attack and severe pain and distress, continuing without abatement, and a defined tumor or area of dulness and tenderness, mental distress, anxiety and a temperature of  $101^{\circ}$ , under this condition of things, an operation would be proper, and at the operation a gentle search ought to be made for the appendix. In short, the severe cases need operation early and the mild ones do not. Secondary operations must be made without hesitation when the symptoms do not improve, as the track of the wound may readily become shut up. In regard to the chronic cases with high temperature and evident collections of fluid, they should be treated like collections of pus anywhere else and are likely to do well. Always operate early in the severe cases and never in the mild.—*Boston Med. and Surg. Jour.*, January 16 and 23, 1890.

**III. New Operation for Radical Cure of Hernia.** By DR. WM. S. HALSTED (Baltimore). The operator reports five cases upon whom he had performed the following operation:

1. The incision begins at the external abdominal ring, and ends one inch or less (less than one inch in children) to the inner side of the anterior spine of the ilium on an imaginary line connecting the anterior superior spines of the ilia. Throughout the entire length of the incision everything superficial to the peritoneum is cut through.

2. The vas deferens, with its vessels, is carefully isolated up to the outer termination of the incision, and held aside.

3. The sack is opened and dissected from the tissues which envelop it.

4. The abdominal cavity is closed by quilted sutures passed through the peritoneum at a level higher by  $1\frac{1}{2}$  inches, than that of the so-called neck of the sack.

5. The vas deferens and its vessels are transplanted to the upper angle of the wound.

6. Interrupted, strong silk sutures, passed so as to include everything between the skin and the peritoneum, are used to close the deeper portion of the wound, which is sewed from the crest of the pubes to the upper outer angle of the incision. The cord now lies superficial to these sutures and emerges through the abdominal muscles about one inch to the inner side of the anterior superior spine of the ilium.

7. The skin is united over the cord by interrupted stitches of very fine silk. These stitches do not perforate the skin, and when tied they become buried. They are taken from the under side of the skin, and made to include only its deeper layers—the layers which are not occupied by sebaceous follicles. Dr. Halsted has for more than two years served most of his wounds in this way. The method was suggested to him from his experiments on dogs. He thinks that it is very difficult, and perhaps impossible, to disinfect the skin of a dog, and believes that pyogenic organisms may occasionally be present in the sebaceous follicles of the skin. He had repeatedly observed pus in the suture holes of perforating skin stitches, and could not with any certainty secure primary union of the skin wounds in dogs until he had resorted to this



subcutaneous method of sewing the skin. He had also observed that skin sutures not infrequently suppurate, even in wounds sewed by the most careful surgeons in this country and abroad.

8. One or two small, short gauze plugs are used as wound drains.

The immediate result in all the cases reported was good. Three of the patients were children, two adults. Sufficient time has not yet elapsed to test the ultimate results.—*Johns Hopkins Hosp. Bull.* Dec.

**IV. Fecal Fistula following Hernia.** By PROF. CZERNY (Heidelberg). In the course of a paper read before the Sixty Second Congress of German Naturalists and Physicians, at Heidelberg, 1889, upon resection of the intestins, Czerny refers to 6 cases of operation for fecal fistula following the occurrence of hernia. In general the fistula was circumscribed elliptically by an incision, the incision lengthened and the bowel loosened from its attachments. Turning the edges of the mucous membrane and uniting the parts by means of successive layers of sutures sufficed in only two instances. In the balance of the cases circular resection of intestine preceded the suturing; otherwise stenosis of the bowel at this point was to be found. In one case in which numerous fistulous tracks permeated the vicinity, the abdominal cavity was opened above Poupart's, the bowel loosened and sutured at the point where it was joined by the fistula. Five cases of fistula communicating with the small intestine, and one with the transverse colon, were resected with the best results. One case, that of a female exhausted by phthisis, induced by want of nourishment, died of collapse; healing by primary union took place in the remaining five.

Kœnig, of Göttingen, in the course of the discussion which followed Czerny's paper, related 3 cases in which, after enlarging the opening, he drew the bowel forward and closed the opening leading thereto, by transverse sutures, thus avoiding resection of the bowel.—*Centlb. f. Chirg.*, No. 51, 1889.

G. R. FOWLER (Brooklyn).

## EXTREMITIES.

**I. Treatment of Aneurisms of the Limbs.** FRENCH SURGICAL CONGRESS, (Oct., 1889). When this subject came up for consideration, of

nine prominent surgeons who took part in the discussion, six were in favor of ligating the artery above and below the diseased point and extirpating the sac.

For arterio-venous aneurisms they all agreed that ligation of the vessels combined with extirpation of the mass was the only method of treatment.

Verneuil was of the opinion that non-operative methods should be used when the patient was above 70 years of age, for at this time of life the mortality after operation was exceedingly high, and that at this time non-operative methods gave brilliant results. Verneuil spoke against extirpating the sac in ordinary aneurisms, as simple ligature of the artery gave good results.—*Revue de Chirurgie*, No. 11, 1889.

F. C. HUSSON (New York).

#### GENITO-URINARY ORGANS.

**I. Surgical Exploration of the Kidneys.** By DR. J. RECAMIER (Paris). The author reviews the different methods of exploration for purposes of diagnosis of the surgical affections of the kidneys. Exploratory puncture is spoken of disparagingly, while percussion and palpation are endorsed unqualifiedly. The bimanual (Guyon's ballottement and Glénord's "nephroleptic") method, with the patient in the dorsal position, it is claimed, permits of a very thorough examination of the organ, revealing increase in volume, mobility and conditions of undue sensibility. The most important point in the author's thesis relates to the immediate examination of the organs by means of an exploratory incision, this being, as a rule, made in the lumbar region, save in those cases in which it is necessary to demonstrate the existence of both organs, as well as where the location of the disease cannot be previously determined; hence the abdominal incision is preferred. Early exploration by incision is recommended particularly in the following: 1st, In those cases in which the diagnosis rests between nephro-lithiasis and commencing tumor, as well as where the character of a suppuration in the pelvis of the kidney remains in doubt. 2d, In cases of anuria with obstruction of the ureters. 3d, For the purpose of demonstrating the existence and condition of the other

kidney. 4th, In severe contusions of the organs.—*Monograph*, 1889.

**II. Upon Palpation of the Healthy and Diseased Kidneys.** By DR. J. ISRAEL (Berlin). The conditions under which the kidneys are not accessible to palpation are the following: 1st, The presence of a large amount of fat surrounding the organ; 2d, Great tension upon the abdominal walls; 3d, Where but a slight distance exists between the crest of the ilium and the lower ribs. Well marked development of physiological lordosis of the lumbar vertebræ is indispensable to the manipulation. The bowels must be previously emptied.

The three practicable procedures of palpation are, 1st, bimanual palpation in the dorsal decubitus. The operator stands upon the side to be examined, and with the corresponding hand makes deliberate but gentle pressure at a point, one inch below the junction of the 10th rib with the costal cartilage, while the other hand makes counter pressure from the lumbar region. 2d, Guyon's "renal ballotement." The patient and operator stand as in the foregoing procedure. With the hand pushed under the lumbar region the operator makes a series of gentle but short, regular and quickly successive blows, by means of which the kidney is projected in a jerking manner toward the anterior abdominal wall. 3d, The author's method of examination in the lateral position; examination of the left kidney is made with the patient upon the right side, the operator standing upon the right side and placing the right hand upon the lumbar region, the left resting upon the anterior abdominal wall. During respiratory movements the finger tips glide over the lower edge of the kidney. He found, contrary to the expressed view of other observers, that the unattached or movable kidney takes part in the respiratory movements although not to the same degree as the liver and spleen. In the normally attached kidney only the lower third, or at the most the lower half, of the organ can be palpated; the rounded edge of the organ can be felt and distinguished from the liver and spleen. These latter organs may be isolated and their edges lifted away from the kidney by the finger tips.

By means of the latter method, the author succeeded in diagnos-

ing. in a boy æt. 14 years, the existence of a normal kidney upon the one side, while there existed a sarcoma of the organ upon the other; a similarly gratifying diagnosis was made in a woman with a nephrolithiasis. In an emaciated woman with persistent hæmaturia, he was enabled to locate a calculus in the kidney, subsequent operative interference confirming the diagnosis. Further, a case of carcinoma of the kidney already published is referred to in which a carcinomatous nodule, of  $1\frac{1}{2}$  cherry size was detected. Tumors of the kidney, attached as they are, in the great majority of cases, to the anterior abdominal wall, are best demonstrated by the renal ballotement, providing the tumor is not so large as to possess an extensive attachment to the abdominal wall. In the latter case the diagnosis must be made by exclusion. The renal origin of the tumor may likewise be shown by its relations to the colon; as a rule the latter passes anteriorly to the tumor and is felt when empty, as a narrow solid cord, rolling under the finger or when distended with gas, as a sausage shaped rounded projection, receding from the touch. Frequently, however, the bowel cannot be demonstrated, particularly upon the right side, where, in its normal relation to the kidney, it is crowded inward, or both inward and downward.

These latter diagnostic points are valid only in cases where the growth is not large, for instance, those which do not fill to a greater or less extent, the entire abdominal cavity. It is possible to confound for instance, a portion of intestine attached anteriorly to the ovary, or to a tumor of the liver.

Information obtainable by means of palpation regarding the nature of the growth is somewhat restricted. In hydatid growths the whirling feeling, in nephrolithiasis the grating together of calculi, when more than one exists, and the lessening of a hydronephrosis from pressure, would naturally suggest the conditions. Otherwise, the pathological diagnosis must rest quite upon other considerations.—*Berlin. klin. Wochenschrift*, 1889, Nos. 7 and 8.

G. R. FOWLER (Brooklyn.)

## BONES AND JOINTS.

**I. On the Immediate and Remote Results of Operations for Localized Tuberculosis.** By PROF. L. OLLIER (Lyon). Ollier is a partisan of amputation for tuberculosis of the bones of the foot; in those cases when at the same time as the local trouble the patient presents marked pulmonary lesions, and in adults after the age of 40.

In young persons not suffering from pulmonary troubles conservative operations give such good results that they should always be attempted.

Within the past four years he has removed the astragalus thirty-two times without an immediate death, but the subsequent results were not equally good in all patients. This was due to the surroundings of the patient after operation.

The good results obtained after resection of the elbow are due to the fact that the patient can go out a few days after the operation and leave the infected atmosphere of the hospital. The resections of the foot, on the contrary, are obliged to remain in bed and in the hospital for a long time, and since endeavors have been made to shorten the stay in the hospital the results have been better.

General tuberculosis following operations for the relief of local trouble is extremely rare and the fear of it should not counterbalance the serious advantages which can be gained by surgical intervention.

Surgical intervention is justified every time that a careful examination of the internal organs shows them to be intact. The intervention should be as early as possible. If a rapid cure is desired, even at the price of the sacrifice of a limb, amputation should be resorted to; but if it is desired to preserve a useful limb for the patient a conservative operation should be attempted, and the younger the patient the better the result.—*Proceedings of the French Congress of Surgery*, 1889.—*Rev. de Chirg.*, Nov., 1889.

F. C. HUSSON (New York).

**II. The Causes of Irreducibility of Old Dislocations of the Hip.** By CH. NÉLATON (Paris). The causes leading to the impossi-

bility of reducing old dislocations of the hip are not clearly recognized as a rule. They are as follows: 1st, changes in the acetabulum; 2d, changes in the capsule, as a result of the luxation itself; the shortening and retraction of the muscles about the acetabulum, and of the adduction. Upon this latter point, special attention is called, and a case related in which, 18 months after open incision of and enlarging of the acetabulum, the tightly stretched glutei and adductor muscles were found to be an insuperable bar to reduction, and excision of the head of the femur was found necessary. The result was not found to be all that could be desired. (It is suggested that incision of the overstretched muscles be performed to the extent of allowing the head of femur either through extension, to be replaced into the acetabulum.)

In the majority of cases, all of these obstacles will be found to exist.

It is found from the literature of the subject that the longest time elapsing between a dislocation of the femur and a successful reduction of the same, with the exception, of a few cases in which accidental reduction took place, is 9 months, although there is some doubt as to the reliability of even these.

The only rational method to be pursued in cases of ancient dislocation, otherwise irreducible, is arthrotomy, although the 9 cases reported have not given very encouraging results. Polaillon (*Bullet. de la Soc. de Chirg.*, 1883, p. 107) has alone succeeded in replacing the intact head of the femur; in the other 8, resection was performed. These results are to be attributed to the method of operation. The incision which gives readiest access to the thickened joint capsule, as well as the acetabulum itself, is the anterior one.—*Arch. Gen. de Med.*, 1889, March.

GEORGE R. FOWLER (Brooklyn).

# THE OPERATIVE TREATMENT OF TALIPES CALCANEUS, PARALYTICUS.<sup>1</sup>

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IN MAY, 1884, I began operating upon a class of cases generally regarded as intractable. I present my results at this time for the sake of a full discussion. Like most of the operations on deformities, observations made many years after the operation are most desirable, yet I feel justified in bringing up this subject now for discussion. Naturally many points have suggested themselves to me, and every case has been instructive. The deformity under consideration is known as talipes calcaneus. By this we understand a form of club-foot in which the heel is depressed rather than raised, —in which the tendon and muscles on the posterior aspect of the leg are elongated rather than shortened, a deformity which compels the patient to walk on the heel while the greater part of the foot is in mid air. The most common cause of the deformity is polio-myelitis, and, as this lesion is most frequently seen in children, the resulting disability is most naturally found in childhood.

I think I am safe in making this statement: That the prognosis in the average cases of talipes calcaneus is bad; that the muscles and tendons are stretched as time goes on rather than the reverse. The orthopædic surgeon and the neurologist need no further description of this form of club-foot, and I do not think they need any information as to prognosis. All present will agree with me, I am sure, that the efforts at walk-

<sup>1</sup>Read before the Orthopædic Section of the New York Academy of Medicine, January 17, 1889.

ing tend rather to increase the deformity, than to diminish it. Clinically, therefore, we have at first a relaxed tendon and muscles at the back of the leg, later an elongated cord or tendon, and later still a club-shaped appearance of the heel, with shortening of the plantar muscles, presenting a typical case of calcaneo-cavus of high degree. When I assert that we have very little encouragement to give our patients if time alone is allowed to effect relief, no carping pessimist in therapeutics can reply that "Oh well, time itself effects wonders in the relief of this deformity." It is unnecessary for me to quote authorities on this subject, for the reason that authorities are, as a rule, unanimous.

It is pertinent, now, to ask what mechanical treatment accomplishes. While I do not profess to be familiar with every form of apparatus that has been employed for the relief of this variety of talipes, I claim a reasonable familiarity with the principle involved in all forms of apparatus. We aim to depress the foot and raise the heel. We aim to make of the case a talipes-equinus, and whatever splint or brace we employ the joints must be arranged with this in view. If rubber muscles are employed they must be attached in such way that the end of the heel will be made to approximate the calf. If webbing is employed in the shape of a strap, this must pass from a band about the calf to the heel, posteriorly. If a joint is simply used, there must be a reverse catch or a buckle of steel which will prevent the apparatus from dorso-flexion. Shoes constructed for this deformity must have an unyielding tongue, a high heel and a snug support about the ankle. It matters little what kind of joint or catch one employ at the ankle, the principle involved is the same. For nearly twenty years I have employed a brace that is constructed about as follows: A steel foot-plate, steel and leather heel-cup, uprights of steel on either side of the leg extending from the heel-cup to a semi-circular band which passes around the calf, the steel uprights making a joint at the ankle with reversed catch. Inasmuch as most of the force is expended on the tibia anteriorly, the steel band is sometimes reversed and the leather portion of the



band passes about the calf, while the steel portion is in front. In my earlier experience it seemed to me that this was all that could be desired. The patient seemed to walk better, and the immediate results were good. A long residence in hospital, however, impressed upon me the instability of such an apparatus, the frequency of repairs, the difficulty of impressing upon patients the necessity of keeping the foot always depressed. It was not an uncommon experience to have the joint completely changed by some local blacksmith, and sometimes months would elapse with the brace contributing to the increase of the deformity. In private practice I am able to control patients more easily, and in many instances have been able to hold the foot in very fair position: yet in no instance have I seen shortening of the tendon occur under treatment of this kind, and only in rare instances have I been able to foresee a time when apparatus could be dispensed with. My own conclusion, therefore, is that mechanical treatment does nothing more than give relief while the brace is in good repair.

For a number of years I allowed myself to be called a neurologist. Nervous diseases possessed a fascination for me. Men whose statements were entitled to respect taught that galvanism and faradism and massage would often effect a cure in a muscle palsied from polio-myelitis. As our knowledge of electricity increased such statements were regarded as unreliable. My own experience in electrical treatment of calcaneus corresponds, I presume, with that of the majority of neurologists of the present day. The current could not restore the motor power to the ganglion cells in the column of the cord. Mere mechanical irritation of the muscle once supplied by this power has little effect on the muscle itself. Applications of this kind improve the color of the skin; the circulation, as the enthusiastic practitioner says, is greatly improved; yet improved circulation does not bring power to a palsied muscle. When I have sent a case of this kind to a neurologist, I have received very little encouragement in the way of prognosis. We must all learn that the prognosis in ordinary infantile paralysis depends, as a rule, upon the extent of the cord lesion.

With such an outlook, therefore, I fell quite readily into operative procedures.

Mr. Alfred Willett published in the St. Bartholomew Hospital Reports for 1880, volume 16, "Remarks upon Resection of the Tendo-Achillis in Paralytic Talipes Calcaneus, with an Account of a New Method of Performing this Operation." He reported three cases, one operated upon October 9, 1879, and reported upon in July, 1880; another on December 13, 1879, not traced; another still, on April 19, 1880, last observation



FIG. 1.--SHOWING DEFORMITY IN CASE I.

June 11, 1880. The immediate results were good. In a letter received from Mr. Willett under date of May 12, 1884, he stated that one of the cases operated upon was in a private patient, and had been under observation up to the date of his letter. The result was very satisfactory. The calcaneus was cured, and with the foot in normal position, the general improvement of the paralyzed limb was enhanced. He still wore a support, and was gaining in walking power without interruption. Mr. Willett was unable to give a final report in the other cases. In the summer of 1887 in a conversation with this surgeon, I got the impression that he was still enthusiastic over

the operation. He makes a Y-shaped incision with the stem of the Y toward the os calcis. The incision is continued down to the tendon, the V-shaped portion including the subcutaneous fat, while the portion of tendon exposed is in the stem of the Y. He resects one-half of an inch of this tendon thus exposed, brings the point of the V-flap with underlying tendon down to the distal portion, and this is approximated to the upper portion by sharp extension of the foot. He sutures the ends together and includes in the suture the V-shaped flap. He employs wire for this purpose. The wound is dressed antiseptically, and healing is prompt and uninterrupted.

CASE I.—Female, æt. 24 years, under mechanical and electrical treatment since 1872; operation May 14, 1884. Her deformity is shown by accompanying photograph. She complained much of fatigue on walking, and had experienced much trouble in wearing her apparatus. The tendon was excised, the edges bevelled; wire sutures were employed; antiseptic dressing and plaster of Paris bandage over foot extended to the greatest possible limit. At the end of four weeks cicatrization had taken place, and she was not allowed to walk until two weeks later. At that time the tendon acted well, she walked with more ease, the heel was not elongated; the ankle itself was much stronger. She has not worn any apparatus since the operation, and my last observation was made January 9, 1890, nearly six years having elapsed. The heel still presents a clubbed appearance. The natural position assumed is shown in tracing No. 1. The tracing No. 2 shows the limit to which the foot can be flexed. No. 3 shows her voluntary flexion. She has slight power of extension; she is able to walk without any support. She does suffer from a deformity of the great toe, namely, sharp flexion. This she thinks has developed since the operation.

CASE II.—Male, æt. 12 years. The left foot was in marked calcaneus. He had been under my observation for 10 years, had worn braces all this while, and the deformity of the foot had increased. The tendon was so long that, at the time of the operation, November 1, 1884, I removed three-quarters of an inch. On attempting to approximate the edges, I found that about one-quarter of an inch too much had been removed. I attempted to suture a piece of the tendon removed, and employed wire as in the former case. The foot was kept extended in plaster for two months, at the end of which time the wound was healed after a portion of the tendon had sloughed. This was removed. The

immediate result was very good. The ultimate result however, was disappointing. He remained under observation for 6 or 8 months, during which time I had to employ apparatus because of paralysis of the quadriceps femoris. The mother became discouraged, and was unwilling to meet the expense of the apparatus.

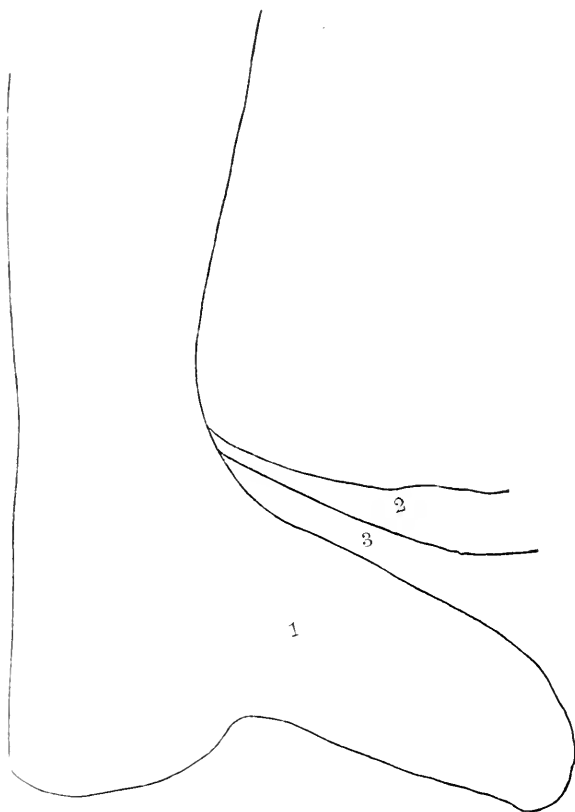


FIG. 2.—SHOWING RESULT OF TREATMENT IN CASE I.

The deformity has recurred, and is as intractable as ever. Not only this, the knee and thigh have become flexed by muscular shortening, and the boy walks on a crutch with limb dangling.

CASE III.—Male, æt. 11 years; operation July 19, 1886. The paralysis affected not only the posterior leg group, right side, but the anterior femoral group, right side, with the latissimus dorsi on right side.

I departed from the rule in this case, simply overlapped the ends after division, and employed cat-gut. The wound was closed by silk, over alternating sutures passing through the tendon. Dressing the same as before. The wound healed primarily; plaster not removed until two months had elapsed. Then a brace with reversed catch was applied. He wore the apparatus for six months. Since then he has worn a leather shoe with cork wedge in the heel and stiff leather tongue. The shoe has been kept in very poor repair, and only recently have we succeeded in getting him properly fitted. The last examination was October 18, 1889. The boy is able to flex and extend the foot well, tendon is not too long, but the anterior tibial muscle is inclined to shorten a little.

CASE IV.—Male, æt. 6 years. Calcaneus, left foot; equinovarus, right foot; both of paralytic origin. Operation, November 5, 1887. One-fourth of an inch of the tendon removed, ends well overlapped, plaster of Paris bandage dressing, and extending above knee, which is put up flexed. Wound healed without suppuration. The final result, January 13, 1890, is that he stands with the foot squarely on the floor, walks very easily, and, while the cicatrix is not very strong, the yielding has been comparatively little.

CASE V.—Male, æt. 10 years. For many years an out-patient, wearing braces, getting electricity and massage. Presented at the time of operation, in February, 1888, flail like joint with heel depressed, tendon elongated. The operation was done very carefully, but sloughing took place at the end of the fourth or fifth week, and a portion of the tendon sloughed. The wound healed in about six weeks. He has worn a shoe with heel raised and tongue reinforced by steel. The last note was made on January 11, 1890. Knee hangs at about  $120^{\circ}$  with the heel and leg; cicatrix quite dense; can flex and extend; no varus or valgus; gets about without difficulty; wears a brace at night to keep the foot fully extended.

CASE VI.—Male, æt.  $5\frac{1}{2}$  years. Four years palsied; unable to walk. Operation February 10, 1888; primary union. At the time of his discharge from the hospital walked with great ease. Twenty-three months later reported by letter as in good condition; details not given.

CASE VII.—Male, æt. 12 years. Lame since the first year of his life. Walked on his heel, the ball of the foot occasionally touching. Operation February 15, 1888. Wound healed by primary union under usual dressing. Last observation made twenty-three months after date of operation. Wearing a pair of ordinary leather shoes; walks well, steadily gaining in power; stands squarely on sole of foot; does not tire on

a reasonable amount of exercise; patient says his foot gives him no uneasiness; parents delighted with the result; tendon stretched a little allowing passive flexion to  $75^{\circ}$ ; foot hangs at an angle of about  $95^{\circ}$ ; can extend voluntarily only to about  $120^{\circ}$ .

CASE VIII.—Female, æt.  $14\frac{1}{2}$  years. Lame for nine years. Many muscles of the limb affected besides the posterior tibial group. Operation February 14, 1888; primary union. Last observation made twenty-three months afterwards. Walked without brace or support, and fairly well; tendon has stretched some, but cicatrix is strong.

CASE IX.—Female, æt. 13 years. Lame from infancy. Required a support for the knee to walk, and then heel only touched the floor. Operation February 27, 1888, primary union. The case was really very little improved by the operation, as she still required apparatus on account of the paralysis of the quadriceps. Twenty-three months after the operation, the foot can be passively flexed to  $80^{\circ}$ , and passively extended to  $125^{\circ}$ . She can flex voluntarily to  $120^{\circ}$ . The result may be said to have been fair.

CASE X.—Male, æt.  $7\frac{1}{2}$  years. Six years paralyzed. Walked on the heel and very lame. Operation March 17, 1888. Wound healed by granulation. Twenty months later last observation was made. Tendon stretched a little, permitting flexion to  $90^{\circ}$ . The muscles on the anterior part of the foot, however, were short, and there was considerable valgus. Has paid very little attention to the shoe or apparatus since his discharge from the hospital.

CASE XI.—Male, æt. 13 years. Lame since he was 2 years old; marked paralytic gait; heel and ball, however, both touching the floor. Operation March 24, 1888; primary union. Last observation 22 months afterward. Walked then very well; tendon a little long, but cicatrix strong.

CASE XII.—Female, æt. 12 years. Infantile paralysis of many years' standing, though only two years markedly lame. Operation April 14, 1888; primary union; gait much improved. Twenty months later, very slight limp; can voluntarily flex and extend foot; cavus not marked. Little or no attention has been paid to the subsequent treatment.

CASE XIII.—Female, æt. 7 years. Paralysis came on when 2 years of age; tendon very long and heel prominent. Operation April, 1888; primary union; patient removed before foot was sufficiently strong for use. Foot in good condition and plaster applied just before patient was discharged, but it broke before reaching home, and the mother failed to appreciate the importance of keeping the foot extended.

Twenty-one months later patient found walking with an almost imperceptible limp, with foot squarely upon the floor; tendon had stretched considerably; moderate degree of calcaneo-valgus remains. Can voluntarily flex foot to  $60^{\circ}$ ; it can be passively flexed to  $55^{\circ}$ , extended to  $110^{\circ}$ . It is necessary to protect the ankle by means of a spring in the shoe.

CASE XIV.—Male, æt. 11 years. Paralysis of ten years' standing. Walked fairly well, but mostly on the heel, and with considerable valgus. Operation May 23, 1888; primary union; deformity was corrected and walked well. Twenty months later cicatrix was found to be strong; foot in very good shape; slight cavus remaining.

CASE XV.—Female, æt. 19 years; In the Out-Patient Department, wearing apparatus and getting electricity off and on for sixteen years; much disabled; heel only touching as she walked. Operation May 28, 1888; healed by extensive granulations. For a long while after the healing walked with foot in very good position, provided the shoe was properly constructed. Twenty months later found to have neglected her shoes; marked cavus remained; cicatrix strong; can voluntarily flex and extend; foot can be passively flexed to  $90^{\circ}$  and extended to  $140^{\circ}$ ; complains a good deal of weakness of the foot, and result upon the whole not very satisfactory.

CASE XVI.—Male, æt. 6 years. Walked on heel. Operation June, 1888, in Out-Patient Department. Plaster removed six weeks later; foot in good condition; healed by granulation. Case not traced.

CASE XVII.—Male, æt. 14 years. Was in the Out-Patient Department for ten years wearing apparatus, which was much of the time out of repair and consequently ineffectual; walking then on his heel, and rolling toward the inner border of the foot. Operation July, 1888; primary union. Discharged from the hospital in good condition; foot in equinus. See Figure 3, which shows photograph of the foot after first dressing. This shows the position of the foot and knee in the plaster. Found 18 months later having sought other treatment and wearing a spring with free joint, but a support to the inner side of his foot. The foot could be flexed to  $85^{\circ}$  and extended to  $140^{\circ}$ . He was able to extend the foot voluntarily but not also to flex. He walked fairly well without apparatus, and it was quite evident that with a properly fitting shoe a useful limb would result.

CASE XVIII.—Male, æt.  $7\frac{1}{2}$  years. Paralyzed when 2 years of age; a characteristic limp, a long tendon. Operation July 24, 1888; primary union throughout. In September of same year discharged with foot in very good position; voluntary motion and passive flexion not be-

yond  $95^{\circ}$ . This boy went out into the country, neglected his shoes, got an instrument-maker to apply a long spring, and was found 18 months later, the tendon having stretched greatly, foot in marked valgus and the good results practically lost.

CASE XIX.—Male, æt. 9 years. In Out Door Department for six or seven years wearing apparatus and getting electricity without good result. There was considerable loss of power in the thigh group of muscles as well. Operation July 24, 1888; primary union. Two

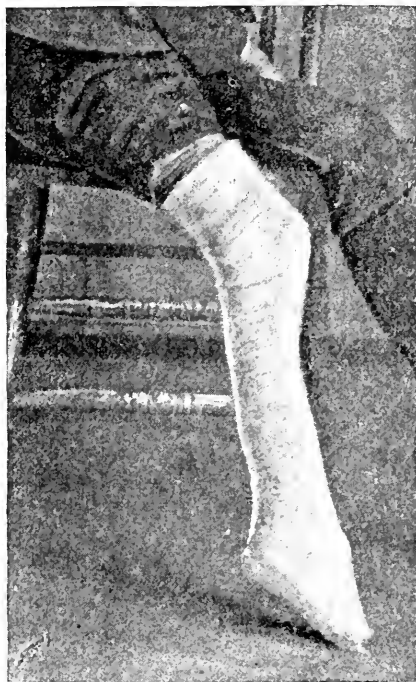


FIG. 3.—SHOWING POSITION OF FOOT, CASE 17, IN THE PRIMARY DRESSING.

months later discharged with foot in equinus. Seen 18 months afterward wearing a common leather shoe; able to flex the foot to about  $80^{\circ}$  and extend to  $100^{\circ}$ ; walks very well; result good.

CASE XX.—Male, æt. 8 years. Deformity at the hip and knee from shortening of tendons, and foot in marked calcaneus; unable to walk. First operation on thigh flexors consisting in free division by open



wound and stretching of ham string tendons at the same time. Three or four months later, on October 2, 1888, Willett's operation. Fifteen months later walking fairly well with long spring; foot in good position; and result very satisfactory.



FIG. 4.—SHOWING CONDITION OF CASE 23 BEFORE OPERATION.

CASE XXI.—Female, æt. 10 years. An idiot and paralyzed since she was a year old. Operation November 2, 1888; healed by granulation. Tendon stretched a good deal during the following year, but with a brace and a shoe foot held in good position and tissues shortened a little. Result in this case fair.

CASE XXII.—Female, æt. 19 years. Paralyzed 17 years; walked on heel and inner border of foot. Operation November 13, 1888; healed by granulation. Twelve months later cicatrix strong; good action of foot; equinus position; foot can not be flexed beyond 90°. Result in this case excellent.

CASE XXIII.—Female, æt. 7 years. Paralyzed during the second year of her life; unable to walk; tendon very long. Operation November 16, 1888; healed by granulation. Both feet were operated upon at the same time, as this was a case of double calcaneus. (See photograph, Figure 4.) Fourteen months later walks with very slight limp; foot hangs at an angle of  $125^{\circ}$ ; can be passively flexed to  $75^{\circ}$ , and voluntarily flexed to  $80^{\circ}$ ; action of tendon good. Result very satisfactory.

CASE XXIV.—Male, æt. 4 years; with extreme calcaneus, paralytic. Operated upon January 29, 1889 in the Out-Patient Department and sent the same day to his home in Jersey City. Wound seemed to do well for about a week. Then suppuration set in, extensive sloughing followed and the child suffered from septic fever, with two or three abscesses near the knee from burrowing of pus upwards. The position of the foot was maintained however, and an excellent result was obtained. Eight months after the healing of the wound the boy walked very well with foot in equino-varus, the position being about  $125^{\circ}$ . He could not flex beyond  $90^{\circ}$ , and could extend to  $140^{\circ}$ . Although little attention has been given to the shoes, his mother was greatly pleased with the result.

CASE XXV.—Female, æt. 9 years. Lame from infancy; the whole posterior tibial group palsied and stretched. Operated on June 6, 1889 at her home on the banks of the Hudson. One side healed by granulation and one by primary union. The result in this case has not been satisfactory, inasmuch as I expected the shoe to afford all support that was necessary. The valgus persisted, the tendon stretched a little, and it has been necessary to make a brace without joint. The cicatrix on right side is strong; tendon acts well; foot hangs at an angle of about  $120^{\circ}$ ; passive flexion can not be made beyond  $90^{\circ}$ ; she can not flex the foot actively beyond  $105^{\circ}$ . She walks, however, very well in the rather clumsy shoe. Her last observation was made January 14, 1890.

CASE XXVI.—Male, æt. 11 years. Operation September 13, 1889. Tracing of foot unfortunately not taken, but the deformity was one of high degree and cavus complicated. The wound healed by granulation. This patient was referred to me by my friend, Dr. Ansel G. Cook of Hartford, at which place, and with whose assistance, the operation was performed. Dr. Cook's report, January 13, 1890, is that the boy walks fairly well with his shoe. He can flex and extend it after a fashion. Examined February 17, and foot found in very good posi-

tion. Action of tendon good; cavus not so pronounced; cicatrix has stretched a little.

CASE XXVII.—Male, æt. 8 years. Deformity extreme. Operation October 15, 1889; primary union. Last observation three months



FIG. 5.—SHOWING POSITION OF FOOT IN CASE 27 BEFORE AND AFTER OPERATION

afterwards. Results still very good. Figure 5 shows position of foot flexed with moderate force before the operation, compared with the position of foot after the operation.

CASE XXVIII.—Female, æt. 12 years. Paralyzed from infancy. Hip and thigh group affected quite as much as the posterior leg group. She had been in hospital for several years wearing long springs. During the year 1889 she seemed to gain more power, and I was able in the summer to omit the brace from the right foot. On November 8, 1889, I did Willett's operation on the left foot, and got primary union. Three months later the foot could be flexed to 95° passively. She was not able to flex by reason of paralysis of the anterior tibial group, but could extend easily. It is necessary for her to wear a spring extending from the upper part of the thigh down to the foot, on account of paralysis of the quadriceps femoris. Result altogether very satisfactory.

CASE XXIX.—Female, æt. 4 years. Was referred to my clinic for an equino-varus of left foot, paralytic. This was so slight that it was not considered of any importance, but the tendo Achillis on the right side was very long, and the foot was in marked calcaneus. The operation was done in the presence of the class in November, 1889. The child was taken home the same day, and an opening not made in the plaster over the wound until a week had elapsed. It was made then

on account of a little pain, and a portion of the tendon was found to have sloughed. The wound soon healed, however, and she now walks with a shoe, foot in equinus. Result is very good.

I want to express my great indebtedness to Mr. Fitzhugh of the Hospital for invaluable assistance rendered me in tracing out these cases, and for the statistical table from which I get the following resume.

The resume is as follows: There were 16 males, 12 females, making a total of 28 patients that have been traced. Of this number, 17 had a good result, 8 a fair result and 3 a poor result. By "good" is understood ability to walk with foot squarely upon the floor, not striking the heel first, and to walk without the aid of apparatus. By "fair" is understood ability to walk, but tendon has stretched a little and an anterior support is required to keep foot in good position.

Sixteen healed by primary union, and 12 by granulation. Of the 16 healing by primary union, there were 11 good results, 3 fair and 2 poor. Of the 12 healing by granulation, there were 6 good results, 5 fair and 1 poor.

Of the cases reported, the last observation was made in 1, six years after the operation; in 1, five years; in 1, from three to four years; in 1, from two to three years; in 15, from one to two years, and in 9, from three to twelve months.

Judging, then, from these results, it seems to me we can safely predicate a good result in a large number of cases operated upon. If the operation is done where any kind of home co-operation can be anticipated, it seems reasonable to expect a good result in every instance.

NOTE ON A METHOD, PROBABLY NEW, OF  
OPERATING FOR COMPLETE PROLAPSE  
OF THE RECTUM.

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HAVING recently had occasion to operate upon a young woman suffering with prolapse of the rectum of several years' duration, I devised an operation for proctorrhaphy which seems to meet all the indications. As far as I know the method is a new one; but I realize that it is not safe to assert that any operative method is new. Since writing this note I have understood that Dieffenbach proposed a somewhat similar method. The anal aperture was so dilated that I could readily insert the ends of the five fingers of my hand into the rectum. When the bowel was prolapsed it protruded from the anus as a sausage shaped mass about four inches in length.

I determined to cut out a V shaped portion of the posterior wall of the rectum, the apex of the V being upward, and at the same time diminish the anal aperture by excising a part of the sphincter muscle. This procedure would diminish the calibre of the lower part of the rectum and give it a narrow orifice; so that the inferior portion of the intestine would diminish in diameter, as it approached the anus, instead of being a tube with a wide, almost funnel shaped, lower opening through which prolapse was constantly occurring.

The steps of the operation were as follows: Making a small incision in the middle line near the point of the coccyx,

I introduced my finger and broke up the cellular connections behind the rectum as is done in preparing to excise its lower end for carcinoma. The sphincter muscle was then divided in two places by incisions situated each about a half inch away from the posterior median line. By carrying these incisions obliquely backward through the skin until they met at the original incision near the tip of the coccyx, I included between them a triangular portion of tissue which had as its base about one inch of the anal sphincter. With scissors I then cut from the posterior wall of the rectum a long triangular piece consisting of the entire thickness of the wall. The apex of this V shaped section was situated about three inches up the gut while its base corresponded with the space between the incisions by which one inch of the sphincter muscle was removed.

After hæmorrhage had been controlled by catgut ligatures, chromicised catgut sutures were used to bring the divided wall of the incised rectum together. The first suture was introduced at the apex of the wound, that is, three inches above the anus, and was tied with the knot *within* the bowel. Successive sutures were inserted, with intervals of about  $\frac{1}{3}$  of an inch between them, until the lower margin of the rectal wound was reached. The last intra-rectal suture was placed just inside the margin of the anus. They were all tied upon the mucous surface of the bowel so that the knots were within the lumen of the intestine. In this manner the lower portion of the rectum was greatly reduced in diameter. The divided ends of the anal sphincter muscle were then brought together by two catgut sutures and one wire shotted suture. The anal aperture was thus reduced so that it was barely possible to introduce the tip of one finger; whereas originally five fingers could readily be thrust into it. A drainage tube of rubber was then introduced into the cavity between the rectum and the sacrum; and the wound leading backward from the anus to the coccyx was closed by numerous shotted wire sutures carried deeply by means of a strong and curved cervix uteri needle.

This method will, I believe, be found effectual in preventing recurrence of prolapse.

Owing to diarrhœa which occurred a day or two after the operation, the rectal stitches could not prevent the passage of fecal matter into the post-rectal space. As a result suppuration and sloughing occurred there, interfered with early healing, and destroyed what union had already supervened.

The giving way of the stitches holding the wound in the rectal wall and sphincter in proper apposition is to be regretted; but it is possible that the greater degree of cicatrization and adhesion around the rectum, resulting from the prolonged suppurative inflammation, may be valuable in making subsequent prolapse of the bowel even more impossible than would have been the case if primary union had been obtained.

Now, a couple of months since the operation, a cavity about the size of a hen's egg still exists between the anus and the coccyx. It is slowly cicatrizing and contracting, and will soon, I think, be completely healed. The patient goes about, ascending and descending stairs without any tendency to rectal prolapse. There is as yet no control of the fecal evacuations when the bowels are made loose by laxatives; under ordinary conditions constipation exists. The operation has, therefore, been very satisfactory to both surgeon and patient.

## EDITORIAL ARTICLES.

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### ROTTER ON PLASTIC OPERATIONS IN THE CAVITY OF THE MOUTH AND ON THE NOSE

Dr. Josef Rotter, of Munich, contributes to the *Munchener Med. Wochenschrift*, nost 30—32, 1889, an elaborate and fully illustrated article, in which he describes a series of extensive plastic operations done by him while serving as an assistant to Professor von Bergman in the University Clinic at Berlin. They were presumably done at the suggestion and with the supervision of his chief. They are new of their kind and deserving of attention to that degree that they are herewith transcribed quite fully for the study of the readers of the ANNALS OF SURGERY.

I. *Cicatricial Ankylosis of the Lower Jaw*.—Cicatricial closure of the jaws is, as a rule, caused in the following way: The mucous membrane of the cheek is destroyed, either through an ulcerative process, or a burn, and in the process of healing is replaced by cicatricial tissue. The latter has, as is well known, a strong tendency to shrink and retract, especially in case of the cheek, where through the deficiency of bony support, the soft parts easily yield to the traction. In the course of the process it retracts to half or one-third of the size of the original extent of the ulcerated surface, and finally as a rigid band unites the upper and lower jaw so tightly that the teeth cannot be separated. Besides, it possesses such a resistance, that methodical dilatation often furnishes only incomplete results, and even by employing great force under anæsthetics only little dilatation is possible.

The fate of such cases is, therefore a deplorable one. They can then be radically cured only, if after removal of inelastic cicatricial tissue, the wound of inner side of the cheek be covered by mucous membrane or epidermoidal skin. Then shrinkage is excluded. In case of great ex-



tent of the defect there is a deficiency of mucous membrane. The obtaining of epidermoidal tissue from the skin, and the technique of its implantation are difficult and explain why such operations have been hitherto so rarely performed.

Gussenbauer<sup>1</sup> made about ten years ago successful trials in this direction. He rotated the cheek in the true sense of the word, viz., he turned the outside inside, toward the cavity of the mouth, and the raw inner side outside, and covered the latter then by means of a piece of skin taken from the neck.

This complicated procedure has recently been supplanted by a much simpler one by Gersuny<sup>2</sup> and Hacker<sup>3</sup>.

Gersuny, after extirpation of a carcinoma of the mucous membrane of the cheek, covered the defect immediately with a pediculated flap from the neck. He separated the cheek from the lower jaw and put the flap which was taken from the neck through this slit into the mouth so that the base of the flap rested upon the edge of the lower jaw beneath this slit, and the epidermis covered surface looked inward and the raw surface came into contact with the raw inside wall of the cheek where he fixed it by means of sutures. The result was a satisfactory one.

In uncomplicated procedures, this method is certainly to be recommended as a rational one. But if, scars are present beneath the lower jaw, which render the formation of a well-nourished and extensible flap impossible and if one intends to avoid new and disfiguring scars in those exposed parts of the face, especially in patients which are still growing then one must try to procure the material from a remote part of the body. In such a case Rotter took a flap from the upper arm.

The patient, æt. 6 years, through noma had lost the mucous membrane of the whole right cheek, the alveolar processes and also a part of the skin of the cheek, of the size of a half a dollar. The latter defect was corrected by means of a small operation with a flap, taken from the region of the lower jaw. The cicatrix left by the healing

<sup>1</sup>Gussenbauer, *Arch. f. klin. Chir.*, xxi. p. 256 and xxvi, p. 231.

<sup>2</sup>Gersuny, *Centrbl. f. Chir.*, 1887, S. 706.

<sup>3</sup>V. Hacker, *Zeitschr. f. Heilkunde* bd. ix.

process on the inner side of the cheek led to such a high degree of closure of the jaw, that only liquid food could be taken; also upon the affected side the teeth of the upper jaw bored themselves into the gums of the lower jaw. Methodical dilatation having failed, the following operation was resorted to :

At first the cheek and alveolar processes which had become broadly agglutinated, were separated with the knife, and in order to manipulate more freely behind, the cheek was split by a perpendicular cut at the anterior edge of the masseter muscle. Through the slit thus made, the finger could be introduced into the cavity of the mouth and one could stretch the skin extending between the upper and lower jaw; and thus find every unyielding cicatrical band which then could be divided by the knife. After the cicatrical tissue had been extirpated the mouth could be opened nearly to the normal degree.

A pediculated flap of skin from a remote part of the body was essential to fill the defect and for this purpose the upper arm seemed to be most available. Accordingly the right arm was placed in the proper position, and fixed to the head by means of adhesive plaster, cotton and bandages—plaster of Paris cannot be used, as the dressing becomes too voluminous—a pediculated flap was formed from that part of the upper arm which was in closest proximity to the slit of the cheek, and put in through this slit into the cavity of the mouth, so that the epidermis-covered side of it was directed toward the teeth while its raw surface came to lie upon the raw inner surface of the cheek. For the purpose of facilitating the careful fixation of the flap in its new position, especially in the folds of the cheek, it was necessary to divide the cheek horizontally by an incision from the angle of the mouth outward to the primary perpendicular incision. After the fixation of the flap this horizontal incision was immediately closed by sutures. The arm had to remain in its fixed position upon the head, until the skin flap, which received its nutrition through the pedicle, connecting it with the upper arm, was so closely healed to and connected with the cheek, that it was sufficiently nourished by the latter. This requires according to the experience of others, seven to nine days. During this time the apparently uncomfortable position of the arm upon the head, was borne excellently.

On the seventh day after the operation one-half of the pedicle was severed and on the ninth day the other half; the vertical slit in the cheek was then closed by sutures. The flap had healed in its whole extent to the inner side of the cheek and its appearance was not changed in any way. The functional result was very satisfactory.

The patient could again separate the teeth to the width of one inch, and could satisfy her excellent appetite, so that she presented in a short time a blooming physique. About a year and a half after her dismissal from the clinic, information was received that the result was a lasting one, that she could open her mouth then just as wide as after the operation, and that the ingrafted skin-flap had remained unchanged.

II. *Covering of a Defect in the Hard Palate by Means of a Flap from the Forehead*—Aside from the typical and frequently practiced urano-plasty according to the methods of von Langenbeck, in which the congenital fissure of the hard palate is closed by means of flaps consisting of mucous membrane and periosteum there are only two cases reported in the whole literature, in which defects of the palate have been closed by other procedures. Blasius tried in a patient, in whom the nose as well as the hard palate seem to have been destroyed, to heal into the defect in the palate a pediculated flap taken from the forehead, which he introduced in the cavity of the nose. The result, however, was negative, as the flap became gangrenous. Von Langenbeck does not approve of this method. He said, that this cutaneous flap, being stretched and exposed to a double current of air, therefore would certainly become dry and gangrenous before the heterogenously organized wound edges could unite.

This method of Blasius was often tried on cadavers by Prof. von Nussbaum, pulling the flaps from the forehead through a slit, which he formed in the lateral wall of the nose, into the palate defect. He had never an opportunity to try it on the living subject.

The second case was operated upon by Thiersch in the year 1868, and was successful. He closed a hole in the hard palate which was caused by a shot, by means of a flap formed from the whole thickness of the cheek, the apex of which, reached down as far as the lower jaw

and rested with its base in the region of the upper jaw. After chiseling away the superior alveolar maxillary process he carried the flap into the mouth and sutured it into the palate defect, where it healed in smoothly. The good result Thiersch principally ascribes to the circumstance, that the flap was formed from the whole thickness of the cheek, thus having upon both sides an epithelial covering, externally epidermis and internally mucous membrane, doing away with the danger of the tissues becoming dry.

To these two cases the author now adds a third, operated upon two years ago. Blasius' method was chosen and through certain modifications, which partially were made possible only by modern surgery and partially resulted from the peculiar circumstances connected with this case, a very satisfactory result was obtained. The patient, æt. 6 years, was afflicted with a congenital right sided total labio-palatal fissure of unusual width. The cleft palate was operated on according to the Langenbeck method; the united flaps, consisting of mucous membrane and periosteum, healed in their whole extent by first intention, but on the left side, between the edge of the flap and the teeth, there remained a defect about a half inch wide, through which the mouth and cavity of the nose communicated with each other. As the processus palatinus of the left upper jaw had not a horizontal position but as is found exceptionally in very broad cleft palates, it occupied a nearly vertical position, so that the cleft could not be closed entirely.

To remedy this defect it was decided to bring a flap from the forehead, with a long pedicle, and carry it through the still open labial fissure into the palatal defect.

A long tongue-like cutaneo periosteal flap was first formed from the forehead, and the defect in the forehead was at once closed by a simple shifting of the skin. The raw surface of this flap, viz., the periosteum which had been separated with it, was now covered with skin grafts according to Thiersch's method, and was secured upon the forehead for the time being. After eight days the skin grafts were healed to the flap. Now the operator possessed a skin flap which was covered on both sides with epidermis, and seemed to be freed from the danger of becoming dry in its future position. In order to make its pedi-

cle sufficiently movable it was necessary to carry the right incision on the side of the nose as far as into the hare-lip and to separate the right half of the nose from the pyriform aperture. Then, by turning up the nose, the long flap could, with ease, be put through the labial fissure into the palatal defect in such a manner that the grafted surface was directed towards the nasal cavity, the natural epidermis side toward the oral cavity, and the apex of the flap came to lie in the posterior part of the defect. A few sutures sufficed for its fixation. After eight days this forehead flap had healed to the adjacent tissue in its new position. The pedicle of the flap was then cut through at a point on a level with the edges of the incisor teeth. The parts outside of the oral cavity and the nose were brought back into normal position; the defect caused in the face by the formation of the flap could be entirely covered. Finally the hare-lip was repaired. The disfigurement in the face by cicatrices was slight.

The flap healed nicely to the palate and in spite of continued moistening by the saliva and exposure to the effects of chewing it has remained unchanged two years after the operation. The development of hair upon the same, as taken from the forehead, is minimal. The sensations of taste and pain are as good as normal.

III. *Rhinoplasty With a Skin—Periosteum—Bone Flap.*—Rhinoplasty performed for bony defects of the nose has had very doubtful results as flaps formed of soft parts were used.

The nose, generally exceedingly voluminous at first, soon shrinks away to normal proportions, thus satisfying the hopes of the patient, but as time goes on it dwindles down to a puffy and insignificant roll of skin. In order to do away as much as possible with the cicatricial retraction Thiersch<sup>1</sup> introduced bracing of the flap, a procedure furnishing better results, but it necessitated using much skin from the face. The ideal for which all strove could be seen in the efforts to form a new "bony frame-work." Langenbeck in seeking this took bone strips from the edges of the pyriform aperture and placed them upright against each other like rafters of a roof, over which he expanded the skin flap

<sup>1</sup>Thiersch, ueber eine Modification der Rhinoplastik, Verhandlungen d. deutschen Gesellschaft f. Chirurgie, viii, p. 67.

taken from the forehead. Unfortunately these pillars sank on account of the lack of support at the place of their union. The hope that the periosteum which was taken simultaneously with the flap from the forehead might produce bone and serve as a solid support has proven itself to be delusive. This long felt want in rhinoplasty has recently been filled by Koenig through the introduction of an exceedingly invaluable plastic material, the "skin-periosteum bone-flaps" (=S.P.B.F.), which he used in the treatment of so-called "Sattelnasen," for the building up of a bony dorsum of the nose. The procedure of Koenig was used by the author in a somewhat modified manner with very good results in the following case:

The patient, a female, æt. 17 years, as a consequence of an "ulcer" (probably hereditary syphilis) suffered from a sinking in of the dorsum of the nose when 8 years of age. In order to remove this deformity the tip of the nose, which through the sinking in of the dorsum nasi was turned upward, had to be drawn down again and a new and straight dorsum be formed.

For the formation of the latter the author took a skin-periosteum bone-flap from the middle of the forehead by circumcising with the knife, at once penetrating down to the bone, a rectangular skin-flap of about  $\frac{3}{4}$  inch in breadth and 2 inches in length. Through this cut in the skin a  $\frac{1}{16}$  inch deep furrow was made in the bone by means of a sculptor's gouge placed upon its edges. This furrow circumscribed the bone-flap, which was raised by a chisel put flat towards it and having the same breadth as the bone-flap, which was separated from the diploë, proceeding from above downward. The separated frontal flap consisted now of skin, periosteum and a  $\frac{1}{16}$  inch thick bone plate, all connected with each other. Thereupon the little turned up nose was separated by an oval incision at the angle of the sinking in on a level with the pyriform aperture and drawn down into its normal position, whereby between it and the sunken in bony dorsum nasi a triangular defect was left. The latter was now bridged over with the frontal flap, which was arranged in such a manner that the fold of the pedicle was formed upon the uppermost part of the dorsum nasi, and the epidermis-covered side of the flap was directed towards the nasal cavity, having

its bony side anteriorly. Its free end was pushed under the dorsum of the little pug nose and after freshening up it was fixed by sutures. The stiff transposed frontal flap now kept the little pug nose downward and the former was again kept in its new position by the latter. The firm framework of the nose was thus completed. The defects upon both sides of the nose still required attention. The lateral walls were to be directed upon their inner surfaces, towards the cavity of the nose, and also must have upon their outer surface a covering of epidermis. For the formation of the inner surface the inwardly placed epidermal surface of the original flap, which was broader than the bone plate, was available; for the formation of the outer surface the skin of the original dorsum nasi was used by splitting it in the median line, separating it from the subjacent tissue and rendering it so movable that it could be sutured to the raw surface of the primary flap and the raw edges of the pug nose. Finally only the bone plate which formed the new dorsum nasi was without epidermal covering, which was supplied by grafting after Thiersch's method.

The recovery took its natural course and the result was a very satisfactory one.

The great progress, which is included in Koenig's method for operation, lies in the employment of flaps containing bone, which render it possible to form a straight, narrow and sharply contoured dorsum nasi, and which also make the obtained good results lasting. Observation has shown that this dorsum, formed from this transplanted bone plate, is not absorbed, but that it persists in its original thickness and firmness after four or five years (so far as our experience reaches at the present).

For future cases the author recommends to form the upper skin flap broad enough to enable one to cover completely the oval defect of the nose, which results after the separation of the little pug nose. Then the new lateral walls of the nose will be covered with epidermis on their inner surface in their whole extent.

The good results obtained in the use of the S. P. B. flap in "Sattelnasen" suggested its employment also in *total* defect of the nose, for the formation of *entire noses*, and in two such cases the method was employed by the author.

The first patient, a woman, æt. 20 years, had lost the entire cartilaginous and the largest part of the bony nose through lupus. The membranous septum was absent, the skin of the right cheek was transformed, to a great extent, into cicatricial tissue, and the lower eyelid was turned outward.

The building of a new nose was begun by the formation of an inch and a half broad and two inches long S. P. B flap from the forehead. The defect upon the latter could easily be covered by a simple displacement of the skin after having been denuded, and only a linear cicatrix remained in the median line of the forehead.

The flap so gained was, as in the first case, brought down in such a manner that the skin was directed toward the cavity of the nose, the raw surface presenting itself anteriorly.

From the frontal bone-plate,  $1\frac{1}{2} \times 2$  inches, a framework had to be formed for the nose. The violent manipulations necessitated by it, sawing, etc., would surely have caused a separation of the bone-plate from the freshly taken flap, as it (the bone-plate) was only loosely connected with the skin by the periosteum. The author waited, therefore, until the granulation process had taken place, which by the accompanying inflammatory processes, caused a solid and resistable attachment.

Four weeks later the bone-plate was divided into three longitudinal parts by means of a saw. The median part remained entirely in connection with the subjacent tissues and formed the new dorsum; both lateral parts were separated from the subjacent tissues down to the region of the new tip of the nose, where they were then turned around at a right angle so that they took the position of the *alæ nasi* and acted as supporting bony piers to the new dorsum nasi. They received their nutrition through the connection of their lower end (at the tip of the nose) with the skin of the flap. By this procedure a bony saw-horse-like nasal framework was formed. The dorsum rested above, upon the remains of the nasal bones, and below, upon the new bony *alæ nasi*. To cover this framework with skin was the next step. The surfaces directed toward the cavity of the nose were already clothed by the skin of the frontal flap.



For the external covering of the framework the author used the skin of the pyriform aperture, which was loosened by an oval incision and drawn down. Into the corners of the wound, which resulted on both sides through drawing down of this bridge of skin, viz., at the base of the latter, the bony *alæ nasi* were sutured. The skin itself was used as a kind of binding for the edge of the new large anterior naris.

Further, the lower portions of the lateral walls of the new nose were well covered with the skin of the old nasal dorsum, which, after incising in the median line and lateral separation, was made as movable as possible. There remained still the upper portions of the lateral walls and the dorsum nasi without epidermal covering. These portions were covered by Thiersch's transplantation method.

Finally, an entire nose was formed, which had a solid saw-horse like framework, consisting of bony beams, and having an epidermal covering on its external as well as internal surface. Recovery resulted without any complications.

A septum was lacking for the new nose. Partly for cosmetic reasons and partly to prevent a flattening of the nose, the patient was fitted up with an artificial nasal septum, which was prepared of epidermis-like colored hard rubber. It was half an inch high; the tip of the nose thus rose three-fourths of an inch above the surface of the upper lip.

In a *second case of total rhinoplasty* the author devised another procedure by which he thought to imitate much better the architecture of nature. Instead of a saw-horse like framework, he built up a solid bony septum, upon which he hung the lateral soft parts. The patient was a boy, æt. 11 years, who had lost the entire cartilaginous and a large part of the bony nose through hereditary syphilis. The membranous septum was preserved. The operation was begun by the formation of a somewhat triangular frontal S. P. B. flap, the base of which had a breadth of one and one-half inches. The raw surface, *i. e.*, the bone-plate, was immediately covered with skin according to the Thiersch method. Then the skin of the pyriform aperture was separated by a semi-circular incision and drawn down. Thereupon the frontal flap was brought down, after the incision bordering on its right

side had been extended down into the pyriform aperture, and the pedicle was rendered sufficiently movable. Then by turning the pedicle around at a right angle upon its edge it was placed in the position of the former nasal septum, so that the epidermoidal side of the flap was directed toward the left, and the transplanted side toward the right side. The upper angle of the bone-plate rested upon the nasal bones and the perpendicular lamina of the ethmoid bone; the base of it in one half rested upon the floor of the nose, viz., upon the anterior part of the crista nasalis, where the mucous membrane, having been split in the median line, was somewhat separated laterally from the subjacent tissue and was sutured to the edge of the new septum, after its edges had been freshened. The other half of the base of the frontal flap reached above the level of the face, forming the prominence of the new nose and a bony septum.

In order to fix this in its new position, the piece of skin which was drawn down from the circumference of the pyriform aperture was drawn over the part of the new septum corresponding to the tip of the nose, and was thus brought into the position of the *alæ nasi*, and, after freshening its edges, was sutured at the place of contact. With the preserved membranous septum the prominent part of the base of the flap was bound around. Besides, the skin of the old *dorsum nasi*, after having been split in the median line and separated from the subjacent tissues, was sutured to the pedicle of the frontal flap, as in the former case.

By this step of the operation a bony septum, the *alæ nasi* and the upper part of the *dorsum nasi* were formed. Between the latter and the *alæ nasi* there still remained on both sides a triangular defect, by which the nasal cavity continued to be open. This defect was closed, in order to prevent disfigurement of the face through further scars, by means of a skin flap taken from the forearm, in a similar manner as in Case I. One week after the first step a flap was formed, having quite a long pedicle, and its raw surface immediately covered with epidermis, according to Thiersch's method. Eight days later, after adhesion had taken place, the left arm was bandaged to the head and the free end of the flap, now covered on both sides with epidermis, was sutured

to the edges of the nasal defect on the right side (the wound edges being freshened), which was accomplished without any difficulty. After the lapse of seven days more, the position of the arm being well tolerated, the pedicle was severed, liberating thereby the arm. The free edge of the flap was now sewed to the edge of the left sided nasal defect. It healed in its whole extent. Finally the twisted pedicle of the primary frontal flap, forming a roll, was separated from the subjacent tissues somewhat below the eyebrow, thrown upward and used for the partial covering of the frontal defect. The remaining frontal defect, after denuding the skin and making two incisions to relieve tension in the region of the hair covered scalp, could be closed in a linear manner through simple displacement.

The result of this rhinoplasty was not as good as the author had expected. The nasal septum, consisting of bone and skin, was too voluminous for the size of the nose, later retention of secretions occurred, and a part of the bone-plate was expelled. Thereby the prominence of the nose was flattened. Besides, the skin-flap, which had been taken from the arm, shrunk considerably, became very thin and covered with an abundant supply of hair. Therefore in the future the author advises to use in covering the nose only skin taken from the forehead, without considering the scar caused thereby.

The first case of total rhinoplasty, at the end of two years, was examined again. The final result was most excellent. The bony framework of the nose had preserved itself well, and possessed such a solidity that even by a strong pressure of the fingers not the slightest dislocation or even yielding could be caused. The lateral bony laminae, which took the position of the *alæ nasi*, have entirely grown together with the new *dorsum nasi*, which they support, as well as with the facial surface of the upper jaw upon which they rest. The *dorsum nasi* is entirely straight. The tip rises about three-fourths of an inch above the level of the upper lip. Respiration goes on freely, with a closed mouth.

The form of the whole nose is a much better one than in those in which the new nose is formed entirely from soft parts, even in their most advantageous stages. This is evidenced by the fact that the patient is now employed as a salesgirl in a silverware store in Berlin.

In the future, according to the views of the author, no rhinoplasty should be performed unless the "Skin-Periosteum-Bone-Flaps" are used; for only with these are we enabled to obtain results with which not only the operator, but also the patient, will be satisfied.

As a method for such operations, according to the excellent final result in the first patient, the author warmly recommends this procedure, which includes the formation of a saw-horse like bony framework.

ALBERT PICK.

RECENT AMERICAN CONTRIBUTIONS TO THE TREATMENT OF  
PENETRATING WOUNDS OF THE ABDOMEN.

1. *Morton*. Abdominal Section for Traumatism. By DR. THOMAS S. K. MORTON, of Philadelphia. *Journal of the American Medical Association*, January 4, 1890.

2. *Stimson*. On Gunshot Wounds of the Abdomen, With Special Reference to Wounds of the Intestines. By DR. LEWIS A. STIMSON, of New York. *New York Medical Journal*, October 26 and November 2, 1889.

1. The author tabulates and analyzes 234 cases in which laparotomy has been done for injuries of all classes; 110 for gunshot wounds, 79 for stab wounds, 27 for ruptured bladder, and 18 for ruptured or contused intestines. One hundred and thirty-eight of all the cases died, *i. e.*, 58.97%. Death succeeded operation from causes as follows: Shock and prolonged operation, 8; peritonitis from delayed operation, 36; peritonitis developing subsequent to operation, 16; peritonitis from overlooked wounds, 11; peritonitis following extravasation from poorly sutured wounds, 4; ditto from wounds which it was impossible to suture, 2; toxæmia from absorption of urine from the peritoneum because of delayed operation after bladder rupture, 7; opium poisoning, 2; cholæmia from obstructed hepatic duct, 2; gangrene of bowel, pericarditis, cerebral embolism, and delirium tremens, each 1; not stated, 16.

In four of the cases which died of other causes before peritonitis could develop, overlooked wounds were found post-mortem. Three cases died on the operating table, ten died immediately upon removal from the table, and forty within 12 hours.

In eighteen instances of penetrating wounds, no intraperitoneal injuries were found after the abdomen was opened. All of these recovered save two, one of which died of accidental opium poisoning, and the other, of causes not stated, in 36 hours.

The author recognizes as the one dominating indication for abdominal section after traumatism the fact of peritoneal penetration. Where portions of one or more viscera have become prolapsed through the wound no contraindication to section and search for other lesions is presented because it is never by any means certain that the prolapsed portions were the only ones liable to injury by proximity to the entrance wound, for they may not have become prolapsed until long after the original injury, and from an entirely different portion of the abdomen. As to the time for the operation it should ever be at the earliest possible moment after injury whenever the circumstances are in the least degree favorable, and often when most unfavorable. The median incision should always be adopted, and a systematic and thorough search for lesions should be made. Preliminary washing out of the stomach is commended. The resort to intestinal anastomosis rather than to excision, and the use of omental flaps to support repaired wounds, is favorably mentioned. After the repair of all injuries, thorough irrigation of the peritoneal cavity with hot water should be done. Where there have been signs of peritonitis, extravasation of fæces or of food, or where the operation has been undertaken late, drainage should invariably be used. In the after-treatment opium in any form should absolutely never be used except to relieve pain, and even then most tentatively. At the very first sign of oncoming peritonitis active saline or mercurial laxatives are imperatively indicated.

2. The author, in this paper, which was read before the Academy of Medicine of New York City, has re-examined the literature of the subject of laparotomy for perforating gunshot wounds of the abdomen with a view to discriminating between the different injuries and establishing some rule for guidance in the selection of those cases in which it is proper to operate, and of those in which it is wiser to abstain. He first contributes accounts of three new cases treated by laparotomy, one of which ended in recovery. He then traces the course of surgical opinion upon this subject during the current century. He calls attention to the untrustworthiness, in respect of the percentage of mortality of statistics made up from published cases, and in order to make a comparison between the results obtained

by non-operative and operative treatment proceeds to examine the cases which have occurred in the hospitals of New York City within a comparatively few years. He gathers 17 cases of recovery under non-operative treatment after gunshot wounds of the abdomen supposed to be perforating, within a period of twelve years previous to 1885. The three hospitals—New York, Chambers Street and Roosevelt—alone contain 23 cases, with 15 deaths, a mortality of 65%. On the other hand, of 31 cases of gunshot wound of the abdomen, which have occurred in New York City since 1884, and which have been subjected to laparotomy, there have been 25 deaths, a mortality of 80.64%. Sixteen of these cases, with 13 deaths, mortality of 81.2%, were treated in the three hospitals named. The author proceeds to analyze these cases but is not able to draw any clear conclusions from them to help as a guidance to action in other cases. He therefore leaves them and devotes the remainder of his paper to a discussion of general considerations relating to the pathology of these injuries. He admits that it must be conceded that it is possible for a bullet to traverse the abdominal cavity without wounding the viscera, but makes the point that the occurrence is far too rare to have any weight in prognosis or treatment, and enunciates the doctrine definitely, that any ball which has fairly entered the abdominal cavity may be assumed to have also wounded some of the viscera. No favorable prognostic inference can be safely drawn from the small size of the ball. The position of the wound on the surface of the abdominal wall bears little or no fixed relation to that of the visceral injuries, but if the direction taken by the bullet can be ascertained, some inferences, more or less important, may be drawn.

Shock, often extreme, is present in a large proportion of cases, but it is also sometimes very slight or even entirely absent. It is often as much affected by extraneous conditions, notably the circumstances under which the wound has been inflicted, as it is by the extent and severity of the injuries, being as much emotional as physical. The signs of perforation of the stomach or the intestine—blood in the stools or in the vomit, the escape of the liquid or gaseous contents of the bowel and their recognition at the parietal wound or within the ab-

dominal cavity, if the exploration is carried so far—are rare and inconstant.

The course of perforating gunshot wounds of the abdomen, in the great majority of cases, is toward death by shock, hæmorrhage, peritonitis and septicæmia. While the statistics collected by the writer indicate that the mortality under non-operative treatment has been overestimated, yet few would be willing to take their chances under it if they believed that laparotomy held but even an equal prospect of success. The author believes that in the future the operation will not only make a better record by a closer selection of cases in which it shall be resorted to, but that it will also show an actual gain in the saving of life, as the result of an earlier and better performance. The tabulation of statistics, according to the length of the interval that has elapsed between the receipt of the injury and the performance of the operation, has unmistakably shown that the chances of success diminish almost to disappearance as this interval lengthens. One who has just received an abdominal wound not necessarily fatal ought at the moment and for a short time thereafter to be able to bear an exploration of the abdomen almost as well as any individual in fairly good general health. In such a case the risks of the operation, when performed under proper safeguards, are, the author believes, less than those of the injury which the bullet has probably inflicted, and it is in such cases that the operation in future is capable of furnishing valuable and superior results. In cases in which considerable time has elapsed since the receipt of the injury and in which the symptoms of septicæmia or peritonitis are present, with marked distension of the abdomen, an attempt to discover and close the perforations of the intestine will almost certainly be fatal, and operative interference should be restricted to the establishment of free drainage of the abdominal cavity through the wound. If, on the other hand, some time has passed, perhaps a day, and the patient is doing well, it may be better to accept the indication that the injury is not severe and is capable of spontaneous cure, and to abstain from interference.

The first question in every case is whether or not the bullet has entered the peritoneal cavity, for if it has so entered, the wounding of the



viscera is to be assumed. It is sufficient as a first step to prove the fact of penetration, and for this purpose a free incision along the track of the bullet should be made. If the search is unsatisfactory, a small incision in the median line into the abdominal cavity may be made for the purpose either of recognizing the presence of blood in the cavity or for introducing the finger to feel for the possible opening in the parietal peritoneum made by the bullet. The use of insufflation of hydrogen gas or atmospheric air, as a means of diagnosis, the author rejects as distinctly inferior to an exploratory incision in facility, efficiency and security.

The penetration having been demonstrated and an operation determined upon, a relatively large incision, usually preferably in the median line, is to be made and the intestines freely exposed and turned out for examination. Time need not be wasted in examining viscera well outside of the course of the ball, but the small intestine throughout its whole length should always be examined. Wounds of moderate size are to be closed by a single row of Lembert's sutures of fine silk. Large and ragged wounds, or multiple wounds close to each other, may require excision and lateral anastomosis. A drainage tube should always be used in the after care of these cases.

## INDEX OF SURGICAL PROGRESS.

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### GENERAL SURGERY.

**I. Foreign Bodies Simulating Pathological Processes.** By C. A. DETHLEFSEN (Copenhagen). The writer gives four cases from his practice, where foreign bodies introduced into the body simulated distinct pathological processes. The first is one simulating the bite of a viper where a peasant woman watching sheep lost a knitting needle and when looking for it she noticed that she was (apparently) suddenly bitten on the foot. She immediately went home and applied some domestic remedy. Pain and malaise soon disappeared but the leg began to swell, and she sought medical aid. Examined, there was no sign of injury, and the limb was not sensitive to pressure. An incision, made between the big toe and the next, where she said she was bitten, revealed a hard body, and with the forceps a rusty knitting needle about 7 inches long was extracted from the sole. No further disturbance. The second is a child, æt.  $1\frac{1}{4}$  years, which had suffered for 3 months from parotitis dextra. The swelling was treated by iodine, unguents, etc., without success. Tumor hard and unfluctuating. From a blister was withdrawn a goose down feather entire. The child had probably gotten it into its mouth and it had gained entrance into its ductus stenonianus where it had set up the trouble.

The third one mentioned, was that of a child, æt.  $2\frac{1}{2}$  years, which had had ulceration of the right nasal cavity, and a chronic eczema of the upper lip. She had been several times under medical care. Examination revealed the posterior opening completely closed. With the forceps a foreign body was extracted which revealed itself to be a mass of rolled paper covered with accumulations from the nose. The child recovered at once.

The fourth case is that of a servant girl, æt. 30 years, who, for

about 14 days had suffered from pains in the right ankle and the left wrist. As the pains increased and were accompanied by fever, swelling and tenderness, there seemed no doubt that she was suffering from febris rheumatica. Although treatment was *lege artis* no improvement followed but the disease extended gradually to the larger articulations of the lower and upper extremities. As she said she had gotten something into her left index finger some 14 days before the beginning of the disease while scrubbing a floor, a deep incision was made under narcosis and a piece of a broken sewing needle was taken out, it lying right on the bone; the symptoms disappeared at once with astonishing rapidity, and four days after the operation she resumed her work.—*Hospitals Tidende*, 30, 1889.

**II. On the Persistence of the Virus of Hydrophobia.** By J. Novi. Novi found in the cadaver of a rabbit which four days before had died of hydrophobia in which the cranium had been trepanated the entire brain and spinal cord to be eaten up by maggots. Experiments were then made with these maggots. An emulsion of three small maggots in eight cm. of water showed itself to be intensively virulent, the animals dying after a typical course in about eleven days. Novi emphasizes that neither the decay of the cadaver nor the digestion of the nerve-substances by the maggots was able to weaken the virus. He controverts the objections that the condition in question might have been sepsis or that the intestinal contents might be the infectious agent by making control experiments with maggots from cadavers of animals not dead from hydrophobia which produced entirely different results, and again he points to the rapid development of the maggots and the rapidity of digestion rendering it improbable that such small quantities of nerve-substance could have such an intensive action. Högys, however, has observed with a fresh and strongly diluted nerve-substance a very long incubation, while Novi's already decayed material had a delay of incubation of one day at the most. Novi thinks that flies and maggots must be considered in the future as a source of infection for animals, as the great capability of infection in spite of decay demonstrates.—*Bull. d. sc. med. Bologna*, 1, 1889.

**III. On the Local Anæsthetic Action of Cocaine in Greater Operations.** By DR. ALBERT (Saarlouis). Albert comes to the following conclusions with respect to the use of cocaine in greater operations:

1. Five % solutions of cocaine are the best means of producing local anæsthesia, even in making great incisions in the skin, removing large tumors, whose enucleation does not require more than three quarters of an hour.

2. Solutions stronger than 5% are not necessary and hence should be rejected.

3. Five % solutions of cocaine used properly—gradual injections—are to be preferred decidedly, to chloroform narcosis in adults on account of it being without danger, and its more rapid action.

4. Chloroform narcosis is in such cases as mentioned above as of old justified in children and anxious persons.

5. It is to be wished that cocaine should be used in the large clinics in the manner mentioned before, it doing excellent service and that it may find its proper appreciation and use.—*Deutsche mil-arztl. Ztschr.* xviii, 11, 1889.

F. H. PRITCHARD (Boston).

**IV. Upon the Employment of Sugar in Wound Treatments.** By Dr. JACOB DANNHEISER. F. Fischer, of Strassburg, in 1885, introduced sugar as a wound dressing, claiming for it special advantages. The author, in an inaugural dissertation, shows that, in spite of the ever varying changes which the special means employed by surgeons in the carrying out of the antiseptic idea, have undergone, this agent is that employed at the Strassburg clinic. The sole change, and one of great importance, is the omission of the impermeable covering formerly employed; the result being that the sugar does not break down so readily into a liquid condition and a condition of dryness of the wound is maintained. The sugar is incorporated in cushions combined with wood wool, etc., when profuse wound secretions occur. It is also used as a powder application to ulcerated surfaces, etc., with the happiest results. It is contra-indicated in cases of cavities left after resections, and where there is secondary hæmorrhage, io-

doform gauze tampons, being here substituted. — *Deutsch. Zeitschrift. f. Chir.* Bd. xxix p. 311.

G. R. FOWLER (Brooklyn).

## OPERATIVE SURGERY.

**I. Proposed Method for Resection of the Wrist-Joint.** By BR. CARL LAUENSTEIN (Hamburg). In cases of extensive tuberculosis of the wrist-joint in adults, where it is necessary, besides the carpal bones, to remove pieces of the radius and ulna, eventually also pieces of the metacarpal bones, where one not only must remove all suspicious capsular remnants and the diseased sheaths of the tendons, but also for the purpose of a thorough removal of everything that is diseased, must remove every trace of periosteum in the neighborhood of the diseased parts, there sometimes remains a very loose connection between the hand and forearm. Lauenstein compares this condition of connection, consisting in main only of tendons, to the connection between a flail and its handle and emphasizes that many a surgeon will with but little hesitation perform amputation.

Lauenstein has, in order to shorten this connection formed by soft parts, performed twice the dorso-radial longitudinal incision to which he *united one in the transverse direction*. The results were good in both cases. The advantages offered by this procedure are .

1. A rapid diminution in the size of the large cavity of the wound, as well as a strong approximation of the hand to the forearm ; and

2. One can give right at the beginning a good dorsally flexed position, which according to the experience of all surgeons is the most favorable for the preservation of its function.

Both patients treated in this way by Lauenstein had, after the operation, a comparatively useful hand. Of course, even through the transverse uniting of the wound, the disadvantageous influence of the resection of the wrist-joint, in general, upon the entire tendon and muscular apparatus, which, correspondingly to the length of the removed piece of bone, becomes elongated and thus diminishes its contractability, cannot be prevented. But Lauenstein yet thinks that the transverse uniting of the wound, also in this direction, offers some advan-

tage, because the presence of an acceleration in the process of healing and the fixation of the hand to the forearm, makes it possible to begin much earlier with systematic after-treatment, which is so important in its therapeutic influence upon the tendon and muscular apparatus.—*Centblt. f. Chirg.*, 1889, No. 41.

ALBERT PICK (Boston).

## HEAD AND NECK.

**I. Contribution to the Study of Angeiomata of the Parotid Gland.** By DR. HENRI HARTMANN (Paris). Angeioma of the parotid gland is rare, and has been but little studied; in fact, it is not even mentioned in some of the best books on surgery.

There is a form of angeioma which develops within the parotid gland itself at the expense of its capillaries, and which differs entirely from the simple subcutaneous angeioma which occurs as frequently here as in any other part of the body.

The author has seen 1 case of angeioma of the parotid gland and has been able to find 8 other recovered cases.

His case occurred in a child  $5\frac{1}{2}$  months old, and was as follows:

The mother brought the child to the hospital for what she supposed was a tumor of the left parotid region which had steadily increased in size for a period of four months. Examination revealed a healthy child, suffering from a tumor of the parotid region, which measured 4 cm. by 5. The skin over the tumor was normal in color. The tumor was soft, compressible, pseudo fluctuating, partially reducible by pressure and seemed to merge in the parotid gland. It caused no functional disturbances and was accompanied by no enlarged glands. Aspiration of the tumor gave pure blood. The tumor was excised and found to be merged with the parotid gland, part of which had to be removed.

Examination of the excised mass shows it to be lobulated and encapsulated on its external surface; deeply it is continuous with the tissues of the parotid gland.

Microscopical examination shows the vessels of the lobules of the parotid to be very much enlarged, so much so that in places they oc-

cupy the whole glandular substance. There seems to be a dilatation of the existing blood vessels and not a vascular new formation. There are besides numerous small hæmorrhages in the interlobular cellular tissue. At a distance from the tumor the glandular tissue is normal; in its neighborhood the lobules are beginning to undergo degeneration. In short, the microscopical appearances were those of an erectile tumor. Unfortunately in only 4 of the 8 cases collected by the doctor was a microscopical examination made, and it corresponds to the description above given.

The cases which the writer cites were published by Tenon, Berard, Duke, Boeckel, Gascoyen, Pridgin Teale and Pilcher.

The writer from a close study of these cases comes to the following conclusions:

1. There exists in the parotid region a form of glandular angioma which has been confounded with hypertrophy of the gland.
2. This angioma like all others appears early in life.
3. This affection is unilateral, and is recognized clinically by symptoms of parotid hypertrophy together with considerable vascular development.
4. It can grow slowly up to a rather advanced age or after having grown gradually it can suddenly increase rapidly in size.
5. It starts by a dilatation of the capillaries of the gland, but slowly undergoes cavernous transformation.
6. The tumor may be transformed into either a venous or an arterial tumor, the arterial development being such that it may be diagnosed as an aneurism by anastomosis.
7. These tumors should be treated as early and as energetically as possible.—*Revue de Chirurgie*, No. 9, September, 1889.

F. C. HUSON (New York).

**II. Teleangiectatic Myofibroma of the Larynx.** By F. FERRERI. With regard to the extreme rarity of cavernous laryngeal tumors Ferreri reports the following case: A man, æt. 50 years, consulted Ferreri on account of aphonia. There was found situated under the left vocal cord, and only visible upon deep inspiration, a small,

broad based, reddish and soft tumor, which for microscopic examination was crushed off under cocaine anæsthesia. During the following night violent hæmorrhage took place, which was stopped by ferri sesquichlor. but commenced again with violence in the morning, so that tracheotomy had to be performed with the wound dilated above immediately after the operation was performed. Hæmorrhage ceased only upon tamponading the larynx, but the patient died afterward of infectious pneumonia. Post mortem: The tumor showed itself still to be the size of a mulberry and sitting immediately under the under surface of the vocal cord. It was a teleangiectatic myofibroma.—*La Sperimentale*.

**III. A Foreign Body in the Larynx.** By Dr. FREIDENSOHN, Three weeks before the patient, a female, had swallowed something hard; since then she has suffered from difficulty in swallowing and breathing; during the last few days there has been violent dyspnœa. Examination by means of the laryngoscope, revealed, together with hyperæmia and swelling of the entire glottis, a white and hard foreign body, lying in the rima glottidis. In its anterior part it was attached to the vocal cords, while in the posterior part of the glottis between it and the vocal cords there was a fissure of one-half a centimetre, through which respiration was possible. Under cocaine anæsthesia the body was easily loosened and extracted. It was a triangular bony splinter—its base lying in the rima glottidis—its point protruding into the larynx.—*Gazeta le Karska*, 12, 1889.

ALBERT PICK (Boston).

**IV. Cancer of the Thyroid.** By L. ORCEL, (*Centlb. f. Chirg.*, No. 4, 1890). From the researches of the author into the literature of malignant tumors of the thyroid body, as well as his own observations upon the material, afforded by the Lyon Clinic, accurate descriptions of 18 new cases are contributed to increase the statistics of this by no means so rare as formerly supposed disease. There is a peculiar preference in its primary development for those between 40 and 60 years of age. Three out of every four cases are found to supervene upon goitre. There is well marked tendency to metastatic growths in the lungs and mediastinum. The prognosis is very unfavorable, the



average duration of life not extending beyond six months. The fatal issue is due more to distention as arising from compression from the presence of growths than from cachexia which is not as a rule well pronounced. Even in cases of complete destruction of gland tissues myxœdema is not observed.

Treatment is of no avail so far as chances of recovery are concerned; palliative measures are alone admissible. Total extirpation is impossible in the great majority of cases; when possible, a rapid return of disease is inevitable. Even palliative tracheotomy, gives but temporary relief, this scarcely extending over more than a few weeks, and frequently but for a few days. In the cases in which dysphagia and dyspnœa resulting from compression are added to the intense pains radiating to the head, the author recommends Poncets "circumthyroidectomy." A cross shaped incision is made from the upper edge of the thyroid cartilage to the sternum and from one sterno-mastoid muscle to the other, including, if necessary, the sterno-hyroid, sterno-thyroid and the inner two-thirds of the first mentioned muscle, in such a manner as to relieve the tension of the muscular structures, and allow free movements of the growth upon the neighboring parts. (H. Frank, of Berlin, in commenting upon the assertion of Orcel regarding the absence of cachexia struma priva of Kocher, or the myxœdema of Reverdin in cases in which the gland tissue had entirely disappeared, quotes an observation by Gulliver in which this condition was present in carcinoma of the thyroid body).

G. R. FOWLER (Brooklyn.)

## CHEST AND ABDOMEN.

**I. The Surgical Treatment of Local and General Peritonitis.** By W. GILL WYLIE, M.D. (New York). The author reports three cases of localized peritonitis and perityphlitic abscess cured by incision, and two cases of general peritonitis, one due to the bursting of a typhlitic abscess, and the other to a perforating ulcer of the cæcum, which were brought to recovery by laparotomy, thorough irrigation of the peritoneal cavity and drainage. His general conclusions are as follows :

When there are symptoms of local peritonitis, intense pain and tenderness, followed by tympanites and vomiting, with chilly sensations and rise of temperature, search should be made for the cause. As a rule the pain will soon become localized over the region of the Fallopian tubes, the cæcum, or gall-bladder, or some old ventral or inguinal hernia. If signs of a tumor or exudation can be definitely made out, and the general symptoms indicate the formation of pus, then the patient should be etherized and the pus reached by incision, the pus evacuated, the cavity washed out and drained. If it is in, or involves, the tubes and ovaries, the abdomen should be opened, and if the tube or tubes be occluded, and pus found, they, with the ovary or ovaries, should be removed. If the abscess is around the appendix vermiformis or cæcum, an incision should be made near the crest of the ilium, and the peritoneum dissected up till a place is reached where the peritoneum is adherent to the tumor, which should then be carefully opened, the pus evacuated, the sac washed out, and drainage tube introduced without opening into the free cavity of the peritoneum. If it is about the gall-bladder, if the signs of pus can be made out, an incision over the sac should be made and the pus evacuated.

If the general symptoms are severe and no localized centre of pus made out, then an incision should be made in the median line and the peritoneal cavity explored with the index finger. If then a pus-sac is found, if it be so situated that it can be reached by another lateral incision and the pus evacuated without allowing the pus to escape into the free peritoneal cavity, it should be made, and the median incision closed. If it cannot be reached by a lateral incision where the wall of the sac is adherent to the abdominal wall, then the pus should be drawn off from the sac by an aspirator or trocar, and the cavity washed out clean with an antiseptic solution before it is freely opened, and a drainage tube inserted.

If signs of general peritonitis show themselves, that is by vomiting, obstinate constipation, tympanites, etc., then a free incision should be at once made in the median line and the starting-point of the peritonitis found if possible. If it is over the cæcum an incision should be made over it, and the pus washed out by means of hot water of a tem-

perature of 110° to 115°F., run from a large fountain syringe with a large-sized glass drainage tube attached to the rubber. After the free pus about the cæcum is well washed out, several fingers or the whole hand should be put in the abdominal cavity and the intestinal adhesions broken up, and all puddles of pus completely washed out. Then a glass drainage tube should be introduced into each opening and the wounds closed around them, etc.

In pelvic peritonitis, as a rule, the operation is not necessary to save life; but it may be, and it is better to operate during the first attack, if there are symptoms plainly indicating the formation of pus, for the adhesions are much more easily broken up, and more complete removal of the diseased organ can be done than after contraction and dense adhesions have formed, as they do after repeated attacks of inflammation. Besides, dangerous pelvic abscesses are avoided and the bad influence, of chronic invalidism are prevented. Of course, I refer to severe cases of local peritonitis, where there are symptoms, either subjective or objective, indicating beyond reasonable doubt the presence of pus.

In typhlitis the operation should be done before the fourth day, the earlier the better, so as to prevent the chance of rupture and septic general peritonitis, which is, as a rule, attended by so much shock that no operation can do any good. As a rule, general peritonitis from rupture of a septic abscess is likely to be attended with more shock and rapid failure, and death, than peritonitis from direct perforation.

In all cases of general peritonitis an exploratory incision should be made as early as possible, after trying to lessen the tympanites. If an exploratory operation does no good, it is not likely to add much to the danger.

To succeed in such cases it will not do to merely open the belly, allow pus to escape, put in a drainage tube or gauze, and leave intestinal adhesions causing obstruction to remain to kill even more certainly than septic poison, or fail to empty and wash out all puddles of septic fluid encysted among the coils of intestines; but free incisions must be made, large enough to introduce the hand, to break up all adhesions among intestines, and to freely wash the whole cavity of the perito-

neum and put in two or more drainage tubes.—*Medical Record*, 1890, February 15.

**II. The Surgical Treatment of Volvulus.** By Dr. N. SENN (Milwaukee). A man, æt. 63 years, was subjected to laparotomy for relief of intestinal obstruction on the eighth day after the onset of symptoms. The abdomen was enormously distended, temperature normal. Free incision through abdominal wall; intestines turned out; one complete twist of sigmoid flexure revealed; easy reposition by turning bowel in opposite direction to twist; distended colon incised longitudinally for one inch; evacuation of accumulated fæces by "pouring out process;" irrigations with warm salicylic acid solution; intestinal wound sutured; a reef taken in the elongated mesentery; intestines replaced; external incision closed; no drainage; duration of operation one and one-half hours; rapid recovery; discharged well at end of three weeks.

The author discusses the general subject of the treatment of volvulus, and formulates the following conclusions:

1. The predisposing causes of volvulus are either congenital or acquired, and consist in elongation of certain segments of the intestine, abnormal length of the mesentery, and adhesions.
2. Irregular distribution of intestinal contents and violent peristalsis are the most important exciting causes.
3. Volvulus is most frequently met at the sigmoid flexure and the lower portion of the ileum.
4. Secondary volvulus on the proximal side of other forms of intestinal obstruction is not a rare occurrence; it is also frequently developed during an attack of peritonitis.
5. As a rule, the symptoms are more acute and intense if the volvulus is located above the ileo-cæcal region.
6. Vomiting in cases of volvulus of the sigmoid flexure is not a constant symptom.
7. The most important physical sign of volvulus is a circumscribed area of tympanites which corresponds to the location of the volvulus, but this sign is only of value before general tympanites has set in, and,

therefore, enables the surgeon to make an early and positive diagnosis.

8. All cases of volvulus should be treated by laparotomy if reposition cannot be accomplished by rectal insufflation of hydrogen gas.

9. Reposition should not be attempted without evisceration.

10. Evacuation of intestinal contents by a free incision should be practised in every case where general distention of the intestines is present.

11. Enterectomy becomes necessary if any considerable portion of the intestinal wall has become gangrenous.

12. Irreducible volvulus should be treated by establishing intestinal anastomosis with permanent exclusion of the seat of obstruction from the active faecal circulation.

13. Recurrence of volvulus can and should be guarded against by shortening the mesentery by folding it upon itself parallel to the long axis of the bowel, and suturing the apex of the fold to the root of the mesentery.—*The Medical News*, November 30, 1889.

**III. Experimental Contributions to the Pathology of Ileus.** By Dr. ALFRED KIRSTEIN (Cologne). The author calls attention to the fact that ligaturing the intestine in a dog does not provoke permanent occlusion, because, as the ligature cuts its way through, the divided ends of the intestine reunite, and the animal recovers perfectly. It is different when the intestine is divided and each end closed separately by sutures; in this way typical ileus may be produced. The author narrates an experiment on a dog in which this procedure was adopted. The striking feature was that notwithstanding the completeness of the occlusion, the animal lived for six weeks, without stercoraceous vomiting and other characteristic signs of ileus. In the second week, however, the animal lost appetite and refused to eat, became more and more emaciated and feeble, and finally died of marasmus.

At the autopsy the duodenum was found empty, and only the lower parts of the intestines were filled with fluid faeces, while at the seat of the occlusion the gut was markedly distended.

In the cases in which the intestine is ligatured, symptoms of ileus

(stercoraceous vomiting, etc.) promptly supervene, and it seems strange that they did not occur when the gut was occluded by sutures as above described.

The explanation is probably as follows: Fæculent vomiting may occur as consequence of the interrupted continuity of the intestine, especially if the obstruction is high up; but in general, the symptoms of ileus are more dependent on the injury inflicted on the gut at the seat of strangulation than upon the mere occlusion.

The irritation of the intestinal nerves at the place of occlusion most probably provokes morbid reflexes in the upper parts and disturbs the normal peristalsis.—*Deutsch. Med. Woch.*, No. 49, 1889.

F. C. HUSSON (New York).

**IV. Echinococcus Hepatis; Extirpation with Partial Resection of the Liver.** By VOHTZ (Aarhus). A woman, æt 21 years, had observed a tumor in the abdomen for some nine years. This had rapidly increased in size after a second confinement, eleven months before. There was found a sphere-like, smooth and tensely fluctuating tumor extending below a line drawn from one iliac spine to another and above not to be separated from the liver. It was the size of a child's head, easily displaceable to either side or upward, and but little downward. It had no connection with the sexual organs. It was diagnosed as an omental tumor, on account of its great mobility, and laparotomy commenced, when an echinococcus, occupying the lower and posterior surface of the liver, was revealed. It was excised, and with it a part of the greatly atrophied hepatic tissue was removed. The large and not greatly bleeding wound was united by a strong continuous suture, so that a crest-like elevation was the result, and the abdominal wound was closed. Recovery was uneventful, excepting a slight increase of temperature during the first days after the operation.—*Hospitals Tidende*, 1889, 22-610 612.

A. PICK (Boston).

**V. Perforative Appendicitis.** By THOS. G. MORTON, M.D., (Philadelphia). The author reports seven cases of ulceration of the

appendix vermiformis, with perforation and peritonitis, which were operated by him.

Of these seven, five recovered and two died; of the latter, both were unavoidably operated upon *in extremis*, and although dying within a few hours, the fatal termination was in no wise, he thinks, hastened by the operation.

Each case presented a distinct history of a number of previous attacks of pain in the ileo-cæcal region, which occurred generally at irregular intervals, covering periods varying from a few months to several years.

Four were males and three were females; they were æt. respectively 9, 11, 17, 26, 28, 34, and 52 years. The final attack, during which perforation took place, presented symptoms very much alike in each; intense local pain, increased on pressure, distention of the ileo-cæcal region, fluctuation of temperature, slight rigors or marked chills, moderate or decided sweatings, acceleration of pulse, coated tongue, constipation and a depressed, anxious facial expression.

No tumor could be detected in any case, but in one instance there was some deep hardening of the tissues. Percussion in this, as in fact in the other cases, was markedly tympanitic.

A lateral incision was made in each, and the peritoneal cavity was found invaded by pus in four of the cases. In all of the cases the peritoneal cavity was invaded by pus either before or during the operation, so that the entire abdominal cavity had to be cleaned by thorough and repeated drenchings with warm sterilized water. In all more or less intestine came into view, either as part of the limiting abscess wall or penetrating the opening through it to the general peritoneal cavity. The appendix was found attached its entire length to the cæcum in three cases, and quite free in the other four.

Fæcal concretions were found in every case but one, either lodged in the perforation or free in the abscess or peritoneal cavity.

The abdominal cavity of each was washed out and drained from the lowest part of the pelvis. The abscess cavities were treated by irrigation and partial curetting. The wound of operation was brought together by interrupted sutures of silk, but in each case, owing to in-

creased tension, some of the sutures had to be cut within twenty four hours, and healing by granulation took place. From the time of operation the symptoms were invariably promptly relieved. Convalescence was uneventful except in one instance, in which a limited gangrene of the cæcum took place, with fæcal fistula, which spontaneously closed in five months.

The operations were performed at periods varying from the third to the ninth day after the first symptoms had appeared.

The post-operative treatment consisted, in a general way, in keeping the abdominal cavity drained and the bowels acting freely.

Hypodermic injection of morphine was reluctantly used upon two occasions, shortly after the operation, to relieve pain and restlessness.

Milk and broths were freely given, while stimulants and quinine were early required.

#### GENITO-URINARY ORGANS.

**I. Final Results of Four Operations for Vesical Tuberculosis.** By PROFESSOR F. GUYON (Paris). At the last Surgical Congress Prof. Guyon read a lengthy paper with the above title, giving his personal results and experience. The cases, which are extremely interesting, are recorded here in brief.

I. Male, æt. 24 years, was operated on by suprapubic cystotomy on July 8, 1885, and had then been suffering for two years with symptoms of vesical tuberculosis. Patient was last seen August 26, 1889. Was married and had one child. Only urinates every two or three hours by day and twice during the night. Has gained flesh and strength.

II. Male. Died two years after the operation. The patient suffered from vesical trouble since September, 1886; his urine contained tubercle bacilli. Epicystotomy was performed April 30, 1887, bladder scraped and tubercular ulcers cauterized, since that time patient has been obliged to remain in bed most of the time and had frequent micturition though there was a vesical fistula which discharged much pus. This condition lasted till his death, which occurred July 22, 1889. Autopsy showed both kidneys diseased. The left was a vast purulent collection, divided into pockets and did not communicate with the ureter



which was obliterated. The right kidney was the seat of marked pyelonephrosis. No tubercles found in kidneys or ureters, only found in the vesiculæ seminales. Bladder extremely small, only holding a few c.c. of fluid. There is a fistula at the seat of the hypogastric incision, walls of the viscus thickened, no granulations or ulcerations.

III. Symptoms of seven months standing, epicystotomy March 17, 1888. Right kidney at that time was diseased, increased in size, tender to the touch. Patient had polyuria since 1887. Patient had to urinate as much as 100 times during night. Notwithstanding the damaged condition of the right kidney the operation was undertaken, and patient improved very much till May, 1888, when the left kidney became tender. The bladder was not painful, but a hypogastric fistula remained.

Patient died of marasmus February 7, 1889. Autopsy showed both kidneys tuberculous, the right completely destroyed and ureter obliterated. A number of tubercular nodules were found under the mucous membrane of the bladder. The mucous membrane was smooth and pink, while at the time of operation it was turgescient and thickened; though it showed no ulceration it was scraped with a sharp curette, burnt and swabbed with iodoform gauze.

IV. Male, æt. 34 years. Perineal cystotomy on December 10, 1884 for marked tubercular cystitis; patient died March 25, 1885. Whole of posterior urethra and bladder showed numerous tubercular ulcerations and granulations.—*Annals des Mal. des Voies Urin.*, November, 1889.

F. C. HUSSON (New York).

**II. Case of Scrotal Luxation of the Penis.** By Dr. SERGEI M. MALENOSKY (Kazan). The author details at length the following curious, interesting, and exceedingly rare case of traumatic injury to the male genitals:

A married peasant, æt. 30 years, while being busy about a working thrashing machine, was caught between a revolving horizontal bar and its straps, and thrown over, the right half of his loose and thick trousers being entangled and tightly stretched, and violently dragging all along the integument of the penis, jammed between the garments and

the thigh. When examined by a Feldsher, (medical assistant) immediately after the accident, the patient was found to have (*a*) a complete circular rupture of the foreskin along the retro glandular sulcus; (*b*) another laceration of the integuments about the scroto-penal fold; and (*c*) displacement of the penis under the scrotal skin. The first and only aid consisted in antiseptic irrigations. In about three weeks the wounds healed, but there remained a hole in the said fold, through which the urine was voided. The man soon discovered that he had become utterly unable to perform coition, the penis failing to emerge from the scrotal hole. Feeling anxious to recover his sexual ability, he sought at last, about four months after the accident, his admission to Prof L. L. Levshin's clinic, where the examination revealed the following state of things: The integuments of the penis were hanging down on the anterior surface of the scrotum in the shape of a flabby and shortened cutaneous tube with an open distal end which formed a cicatricial ring impassable even for a little finger. A probe introduced into the sac struck a cicatricial septum at the depth of  $1\frac{1}{2}$  ins. In the scroto-penal fold, just to the left from the raphe, there was present an orifice with cicatrized edges, admitting a little finger. The latter could feel the glans of the penis lying just beyond the hole, in an accessory sac separated from the preputial one by a dense cicatricial partition of from 2 to 4 mm. in thickness. A little deeper the body of the member could be felt, its surface being connected with the scrotal skin but very loosely. When passing water, the patient adjusted the glans to the scrotal hole in a certain manner, the urine escaping in the shape of an arched full-sized jet; when the adjustment was omitted, the urine was seen to at first distend the penal sac and then to flow in an irregular, interrupted stream. On erection the penis remained entirely within the scrotum. To restore normal relation of the parts, Dr. Malinovsky, following Nelaton's and Demarquay's recommendations, made an attempt at reduction of the penis—that is, at placing the latter into its empty cutaneous tube. The operation consisted in (*a*) a crucial enlargement of the preputial orifice; (*b*) dilatation of the tube cavity by big-sized drainage tubes and tupelo-tents; (*c*) a division of the cicatricial partition; (*d*) dilatation of the incision; (*e*) breaking down the adhesion between

the glans and scrotum; and (*f*) attempts at dragging out the glans from its scrotal cavity into the now prepared cutaneous tube. All these attempts, however, utterly failed, the main obstacle being formed by a dense cicatricial constriction in the upper portion of the restored canal. In view of the failure, a phalloplastic operation was resorted to. Having split up the integumental tube from the preputial opening up to the superior one, as well as the scrotum, the author sewed (*a*) the free preputial edge with the remnants of the foreskin on the glans; (*b*) the edges of the penial integumental incision with the scrotal flaps; and (*c*) the latter, anteriorly and inferiorly with the remnants of the inner layer of the foreskin on the glans. The silk sutures were removed on the sixth and eighth day, the wounds healing *per primam*. The member, formed by the phalloplasties, measured 2-ins. in length (from the glans to the pubes) and, to the patient's greatest delight, proved to be quite effective for all his purposes. About six months later, the patient's father informed the author that his son's penis had markedly increased in length; which is attributed by Dr. Malinovsky to stretching and elongation of cicatricial tissues under the influence of erections and coitions. The author has been able to find only four other instances of luxation of the penis in international literature for the last forty years.

They are: 1. Nelaton's case (*Gazette des Hopitaux*, 1850, p. 341) referring to a boy, æt. 6 years, with a similar scrotal displacement. 2. Bonnain's case (*L'Union Med.*, 1854, p. 223) of the same kind. 3. Heyenberg's case (Stromeyer's *Handbuch der Chirurgie*, vol. ii, p. 774) referring to a boy, æt.  $4\frac{1}{2}$  years, in whom the penis was dislocated beyond the scrotum by a horse's kick, the reduction being successfully performed on the tenth day. 4. Moldenhausser's case (*Berliner klinische Wochenschrift*, No 45, 1874) of a hypogastric luxation in a man æt. 57 years.—*Khirurgicheskoy Vestnik*, Oct. Nov. and Dec. 1889, pp. 697-702.

**III. Case of Urethro-Femoral Fistule.** By Dr. NIKOLAI V. SOLONIK (Tiflis). The author details the following probably yet unique case: The patient, æt. 29 years, was admitted to the local Military Hospital on account of a urinary fistula on the right thigh. According

to his statement, two and one half years previously he had been shot from a rifle, the bullet passing through his left buttock near the iliac crest to emerge from the lower segment of the right buttock. For some time he was suffering from agonizing pain about the perineum and pubic bone close to the root of the penis, while for nine months all his urine escaped from the anus during defecations. About one and one-half years before the admission, the urine began to flow, but with difficulty, through the urethra, but shortly afterwards there developed a painful abscess on the thigh which was subsequently incised, a large quantity of pus with two pieces of dead bone escaping. The incision never healed but became transformed into a permanent fistule, through which all his urine passed ever since. In order to prevent contraction of the sinus, the patient was constantly wearing a piece of a drainage tube inserted into the opening and tied around the thigh. The micturition was always quite voluntary, the "calls" being preserved, but rather frequent and mostly painful. Defecation was quite infrequent. On examination the fistula was found to be situated on the antero-internal aspect of the thigh, a hand's breadth below the Poupartian ligament. A bougie could penetrate only 7 cm. the fistula track being obviously tortuous. The urethra proved to be absolutely impermeable about its membranous division. The perineum was indurated and infiltrated all through (especially about the raphe). A forefinger introduced into the rectum could detect a fairly extensive depressed scar on the anterior wall of the bowel. An external urethrotomy, as the only operative procedure for radical cure, was proposed by Dr. Solonika, but declined by the patient. The author points out that the bullet had evidently wounded both the rectum and urethra, but left intact the bladder with its sphincter.—*Khirurgitchesky Vestnik*, April and May, 1889, p. 311.

VALERIUS IDELSON (Berne).

**IV. Absorption of a Piece of Celluloid Catheter by the Bladder.** By F. SALTZMANN. A celluloid catheter introduced into the bladder of a patient broke off near the eye and the fragment remained in the bladder. Two years later, a post mortem being made upon the same patient, the bladder was found empty. The fragment of

the catheter had, hence, been absorbed.—*Finska Läkarsällsk handl.* bd. 30, p. 491.

F. H. PRITCHARD (Boston).

**V. Treatment of Injuries to the Urethra and Their Sequelæ.** By Dr. C. HAGLER. His observations are based upon the experiences in the Basel clinic (Socin's). He discusses the interesting subject of suture of the urethra, both that following primary opening of the perineum and urethra for injury, as well as the resection of a portion of the urethra for stricture resulting from traumatism. In both instances the advantages of the urethral suture were manifest, the parts smoothly uniting, mostly by primary intention and without narrowing. The absence of stricture is accounted for by the fact that the formation of granulation material between the ends of the divided urethra was prevented. Experiments upon dogs confirmed this result. The suture material preferred by Hagler is catgut. In the case heretofore operated upon, the entire thickness of the urethra was included in the suture, but Hagler suggests, in order to avoid premature loosening of the latter, that the mucous urethral membrane be not included (sub-mucous suture). To avoid possible urinary infiltration, the perineal wound should not be closed. In Hagler's experience there is less to be feared from allowing a catheter to remain in situ for the first few days than from repeated catheterization.—*Deutsch. Zeitschrift f. Chir.*, bd., xxix, p. 277.

**VI. Upon the Dangers Attending Catheterization in Certain Forms of Retention.** By Dr. J. ASSMUTH. That certain risks attend the complete emptying of an over-filled and atonic bladder at one sitting in old individuals suffering from urinary retention has long been a recognized fact. The question as to how far one may venture to unload the viscus naturally arises. Even in special works upon the subject, but an unsatisfactory answer, at best, is given. The dictum that in old persons with overfilled bladders catheterization should not be resorted to, as a rule, is laid down, and still more imperatively should this be insisted upon where the tension upon the bladder has occurred gradually, perhaps occupying years in reaching

this condition. The author's experience, as shown by cases occurring in his own practice, convinces him of the disadvantages of the use of the catheter under these circumstances. Suddenly produced changes of intra vesical pressure bring about a disastrous issue through rapid urinary resorption. He advises that catheterization be employed only when an acute retention supervenes; otherwise the interference should be restricted to the introduction, from time to time, into the bladder, of a full-sized metallic sound. This procedure proved itself useful in retention depending upon different causes, such as prostatic hypertrophy, paraplegia, etc. Patients learn, in the course of time, to urinate voluntarily, the urine approaches its normal condition, and the irritability of the viscus is markedly lessened. Only after a long persistence of the treatment by the sound, and its further use being deemed necessary, should the catheter come into play; and even then its full employment should not be reached until after many sittings, at the same time partially replacing the evacuated urine by means of injected fluid. Although in this class of cases there will occasionally occur those who will tolerate the rapid evacuation of the bladder, yet there is no means of differentiating them beforehand.—*St. Petersburger Med. Wochenschrift*.—*Centbl. f. Chir.*, 1890, No 6.

GEORGE R. FOWLER (Brooklyn).

## BONES, JOINTS, ORTHOPÆDIC.

### I. Two Cases of Bilateral Ankylosis of the Hip-Joint.

By E. S. PERMANN.

1. A boy, æt. 12 years, was received August 3, 1888, in the hospital. Two years before he had passed through an osteomyelitis which left behind it a very faulty position of both hip joints. The left thigh was flexed and adducted; the greater trochanter surrounded by cicatrices was about  $3\frac{1}{2}$ -ins. above the line of Nélaton. The left hip-joint, as well as the knee, which stood at an angle of  $45^{\circ}$ , were immovable. The ankle joint was somewhat moveable. The right thigh, flexed, abducted and rotated outward, stood at an angle, open outward, of  $70^{\circ}$  to the buttocks. The hip immovable, the knee unankylosed, cannot be extended beyond a right angle. The ankle joint moveable. There

was a fistula in the upper end of right tibia, atrophy of the leg and slight decubitus. Albuminuria. August 7. Osteotomy was performed under the left trochanter (a wedge-shaped piece being removed), and at the left knee section of the adductors. The right knee was gradually extended from  $90^{\circ}$  to  $140^{\circ}$ . December 29, resection was performed by the chisel of the bony ankylotic right hip. Recovery took place with a fistula. The equinus position of the foot was improved by means of elastic pressure. June, 1889, the patient could walk around quite well with crutches in the room. The right hip-joint flexed at  $45^{\circ}$ . A further passive movement of  $45^{\circ}$  was possible. The active flexion was less. The abduction and adduction were quite good. At his discharge on July 23, his general condition was the same as when he entered. The albuminuria persisted.

II. A boy, æt. 15 years, received October 12, 1888, and who had passed through a bilateral coxitis August, 1886, in consequence of acute osteomyelitis. The right thigh was greatly adducted and rotated inward, the left abducted and rotated outward. The movement of the left hip was completely impossible; in the right, very slight movement. The right greater trochanter projected  $1\frac{1}{4}$ -ins. above Nélaton's line, cicatrices on the right thigh and leg. The right knee was nearly entirely moveable, the left only to be extended up to  $130^{\circ}$  and flexed up to  $90^{\circ}$ . The legs on the whole atrophic. The patient could only move about with crutches and by throwing both the legs forward at the same time. No internal organic disease. October 18, subtrochanteric osteotomy was performed on the right limb. January 2, 1889, resection of the left hip was performed by the chisel, whereby a partially bony union was found. The cotyloid cavity was chiseled out; and the stump of the femur rounded off. Extension. February 2, the wound was completely healed, yet no great mobility was obtained, as in the meantime the right hip had again become strongly adducted, March 28, resection of the right hip was done with the chisel, with a complete removal of the head, neck and great trochanter. April 27, the wound had healed. As the patient was discharged toward the end of June, he could walk a longer time with two canes. Yet he, in his walk, resembled a patient with bilateral luxation of the hip. The right thigh

could be flexed from the limit of extension, 60°, and abducted 50°. There was very slight immobility of the left hip; otherwise it was in a good position.—*Hygeia* (Stockholm), August, 1889.

F. H. PRITCHARD (Boston).

**II. Treatment of Long-Standing Dislocation of Both Shoulders.** SIR JOSEPH LISTER reports two cases of dislocation of both shoulders remaining unreduced at the end of eight weeks and seven months respectively. Having ruptured the axillary artery in a case of the same sort, he decided to cut down upon the bone before trying to reduce it. He made an incision from the coracoid process downward and somewhat outward, in the interval between the deltoid and the pectoralis major, and divided the tendon of the subscapularis at its insertion, and then with a periosteum elevator separated the soft parts from the head of the bone and the inner part of its neck. Pulleys were then applied, and as this traction showed some fibrous bands that were put on the stretch, these were divided. As the head of the bone would not return to its position it was protruded through the wound, as for resection, and the external rotators cut through at their insertion. Then after several attempts with pulley traction, the bone was returned to the glenoid cavity. The wound healed kindly. A week later the other shoulder was operated on in a like manner, except that the head of the bone was immediately protruded and the rotators divided. In seven weeks after the operation the patient was able to dress himself alone, and from that time continually gained power in the arms.

In the second case the same operation was done on the left arm seven months after the injury. The right arm was not operated on until six months later. In this case, instead of detaching the soft parts from the bone, the head of the bone was removed with the chisel, when the bone went rapidly into place. After this procedure, the return of function did not seem to be as rapid and complete as where the bone was left intact. Both cases after operation were able to earn their living by hard manual labor.

As a result of this experience, Lister advises that when the surgeon



feels in doubt as to whether it is prudent to make attempts at reduction, or when such attempts do not succeed, he should, in the first place, cut down upon the bone by the usual incision from the coracoid process downward and a little outward, and then with a curved periosteum-detacher freely separate the soft parts from the inner side of the upper end of the humerus. If this fails, he may proceed to turn out the head of the bone, detaching the insertions of the rotator muscles. Even if this procedure fail, the removal of the head of the bone is open to us.—*Brit. Med. Journ.*, Jan. 4, 1890.

H. B. DELATOUR (Brooklyn).

**III. Inflammation of the Bursa Under the Ligamentum Patellæ.** By Dr. TERRILLON (Paris). The doctor has had the opportunity of seeing several examples of this form of peri-articular trouble, which consists in an alteration of the cellular tissue of the bursa situated beneath the ligamentum patellæ, and it is important to recognize and diagnosticate this form of trouble, and differentiate it from the various affections of the knee joint. The inflammation of this bursa was first described by Gosselin in 1873 (*Archives Generale de Medecine*), then later on by Trendelenburg and Spilmann.

The chief characteristic of this trouble is a deformity of the anterior region of the knee, on each side of the patellar ligament; instead of there being a depression when the knee is semi-flexed, there is more or less tumefaction, which in marked cases can be seen when the leg is extended. This little mass on each side of the patellar ligament is tense, elastic, but does not disappear on pressure, no fluctuation is obtainable; the thickening seems due to œdema. At the same time there is a local rise in the temperature of the affected part which seems to be strictly limited.

There is pain and difficulty in walking, specially during flexion of the knee and this is sometimes impossible. Standing for any period of time becomes painful.

Sometimes there is superadded a contracture of the flexor muscles. A remarkable and noteworthy accompanying lesion is the atrophy of

the extensor muscles of the thigh, and in two of Dr. Trendelenburg's cases this was present to a very marked degree.

This disease, according to Gosselin, Duplay and Trendelenburg, is only seen during youth, that is between the ages of 14 and 23 years, and is more common in girls than in boys.

In many cases it appears spontaneously, though frequently it seems to follow a more or less severe traumatism, such as frequent and prolonged kneeling.

In all the cases in which Dr. Trendelenburg observed the trouble, the patients had a rheumatic diathesis.

One of the writer's cases had a distinct traumatic history and followed a hæmatoma of this bursa, due to a fall against a projecting edge of a stone.

The progress of this affection is slow and chronic, and resists most all forms of treatment. In three of the doctor's cases the duration was over three years, during which time there were periods of severe exacerbations.

The diagnosis is only possible after a very careful examination of the knee-joint, and the disease is often mistaken for an arthritis, but by paying attention to the above described symptoms the differential diagnosis is easy.

The prognosis is pretty good; though the disease is of long duration it does not involve the joint, and only occasions pain, and does not prevent the patient from going about.

The treatment consists in the employment of methodical compression, counter-irritation, massage and electricity.—*Bul. de la Soc. de Chir. de Paris*, Nos. 9 and 10, 1889.

**IV. The Treatment of Genu Varum and Valgum.** By Prof. JULIUS WOLFF (Berlin). In young individuals slight cases of genu varum or valgum, are easily cured by orthopædic apparatus or by plastic dressings.

The treatment of the graver cases is to be divided in two groups; in one a slow and gradual straightening of the deformity is attempted, in the other the result is obtained immediately by operative procedure.

To the first group belongs the treatment by means of portative orthopædic apparatus, the plaster dressing, renewed every three or four weeks, and any of the various splints which have been devised up to the present time, also the method of Heine which confines the patient to bed and uses pressure and counter-pressure combined with extension.

To the second group belongs the solutions of continuity of the bone obtained either through the bloody and non-bloody operations, that is the linear, or the cunieforn osteotomy, tenotomy of the biceps muscle, division of the external lateral ligaments, or the sudden redressement obtained by manual force or by osteoclasis, in order to produce a traumatic epiphyseal separation and a tearing of the external lateral ligaments from the lower end of the femur

The "Redressement Brusque" is dangerous for it is impossible to regulate the amount of tearing which may be done, and irreparable damage may thus be brought on the patient.

Osteotomy has no other drawback except that it is a bloody operation on the bone, a compound fracture in fact, and this drawback should not exist any more since the introduction of antiseptis, if there was not a bloodless method which gave equally good results.

This bloodless method is the conversion of the slow method of applying straightening plaster dressings into a rapid one by several important modifications.

The first modification is that instead of waiting three or four weeks between each "redressement" only two or three elapse and instead of a new dressing being applied each time, only one dressing is necessary; which by the excision of a wedge-shaped piece on the inner side, (in genu varum outer side, in genu valgum inner), and a simultaneous linear division in the opposite side is always rendered movable at the region of the knee joint.

The great objection to this method was the long period during which the knee joint had to be immobilized and the resulting discomfort to the patient.

To overcome this objection the author employs the following device:  
When the perfect straightening has been obtained after repeated re-

movable of the wedge-shaped pieces of dressing, a hinged iron splint, permitting a backward and forward motion, is applied on each side of the knee joint and fastened in position, and from two to four finger breadths of the plaster bandage is removed circularly from around the joint. Thus while the leg remains in its straightened position the patient can flex and extend his leg.

Since January, 1885, Dr. Wolff has treated 89 patients by this method, and expresses the following opinion.

All cases of knock-knee, under twenty years of age, should be treated by the above method, and also older persons in whom the soft parts around the knee joint are sufficiently yielding. In those cases where the deformity is specially rigid and unyielding osteotomy is to be preferred.

As regards the technique of his procedure, Wolff makes the following remarks :

The first dressing is to be as light as compatible with perfect strength.

The region of the malleoli, the patella, the internal condyle in genu valgum, and the external in genu varum, must be specially well padded. The bandage should start at the malleoli and reach as high as the great trochanter.

The application of the bandage is generally made under narcosis, and is made as rapidly as possible, and while the limb is in the false position, as the plaster begins to harden the leg is straightened by an assistant, and a gradually increasing force is applied until the deformity is straightened as much as possible without violence being used.

As soon as the patient is perfectly free from the pain of the "redressement," which usually happens in two or three days, if necessary an increase in the redressement can be made by means of the excision of wedge-shaped pieces from the bandage on the inner side of the knee joint, and a linear division of the opposite side; the dressing thus being made movable at the joint more straightening force together with a fresh bandage at this point is applied. This procedure is to be repeated as often as necessary. Soon as a perfect straightening has been obtained, the iron-hinged splint is applied on each side of the knee joint and fixed in place by plaster bandages, and a circular piece cut out around the knee.—*Deutsche Med. Woch.*, No. 50, 1889.

F. C. HUSON (New York).

## REVIEWS OF BOOKS

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THE NATIONAL MEDICAL DICTIONARY. By JOHN S. BILLINGS, A.M., M.D., LL.D., D.C.L., with the collaboration of many eminent scholars. 2 vols. Imp. 8 vo. 1889. Lea Brothers & Co, Philadelphia.

The publishers in their descriptive circular announcing the appearance of this dictionary claim that the present era is one of word making. And so in striving to keep up with the times they present to the profession this imposing work which defines for us 84,844 words and phrases, all belonging to the language of medicine. But so rapidly does this process of word making go on that it is an interesting fact that a word which is at the present time being talked and written as much as any other one is not to be found in this dictionary, though this book is so recent and comprehensive. The word we refer to is *Appendicitis*! It is true that the editor would have some excuse for rejecting this newly coined term on the plea that it was not lawful to join a Greek ending to a Latin root, but in turning over the pages of the book we find that he is debarred from any such action by the fact that he has already added his sanction to such miscegenation in word-building by admitting the term *perivasculitis*. Whatever the offense to good scholarship this new hybrid word, appendicitis, may give, it is nevertheless very convenient, and so wonderfully expressive of the pathological fact that it is intended to convey that we believe it has come to stay, and will therefore claim the attention of Dictionary makers in the future.

An important feature of this Dictionary is that not only English medical words but also French, German, Italian and Latin are given in it, both as independent words and as synonyms. The convenience

which this feature of the book will be to many students must be very great.

The whole make up of the book is attractive; the principal terms appear in heavy faced type that makes them prominent, and by the use of lighter type and of italics for definition and cross references, the eye is greatly aided in its search for required information. The definitions are clear and concise. The whole is presented in two good-sized convenient imperial octavo volumes of about 800 pages each.

It would be expected that a Dictionary compiled under the direction of one who had enjoyed such special training and who had abundant access to such special helps as has been the privilege of the eminent Librarian of the Surgeon General's office at Washington, would unite in itself many and unusual features of excellence. That he has been willing to add such a laborious task as the preparation of these volumes to his other duties will not fail to be gratefully appreciated by the medical profession. We welcome the book and commend it to the confidence of every reading physician.

We have looked with a little curiosity to see how this Dictionary would treat the orthography of those two very common terms, hæmorrhage and cannula. There is a very strong tendency among many to simplify both of these words and follow the French by writing hemorrhage and canula. Dr. B, however, though recognizing that hæmorrhage is sometimes spelt with an e instead of æ, still gives every prominence to the diphthong, and obviously the whole influence of this Dictionary is to preserve the old spelling which it has by right of derivation. When we look up *cannula* however, the case is reversed. Though cannula comes rightfully by its two nn's by derivation from the Latin *canna*, we find it here treated as an interloper. The reader is informed that a cannula is a canula, and for further information has to look further as to the latter word.

The inconsistency in the treatment of the two terms is apparent. Such a thing as this is, however, but a trifle. The book is a grand one, and ushers in the year with much promise as to the high character of the literary work which the *Annus Medicus*, 1895, has in store for us.

L. S. PILCHER.

ON EXCISION OF THE SUPERIOR MAXILLA. A  
STUDY OF TWO HUNDRED AND FIFTY  
CASES.<sup>1</sup>

By JOSEPH D. BRYANT, M.D.,

OF NEW YORK.

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IN submitting to your attention this somewhat brief contribution to the surgery of the face, permit me to remark at the onset that these cases are not consecutive, except in the sense that they did not occur simultaneously, and, moreover, that those of the series with which I myself have had professional relations make up a very small portion, indeed, of the entire list. Therefore, this is not an instance of "Where more is meant than meets the ear." The object of presenting such a number of cases, gleaned from the extended literature of the subject, is to determine whether or not further practical means for the better security of life and for the prevention of disease recurrence, can be suggested in connection with this somewhat familiar operation. Deformity, death and disease-recurrence are the three most potent factors of a case that control the final action of unfortunate patients. That the cosmetic element of an operation wields a most forcible influence on the inclinations and final decisions of luckless patients, is a matter of common observation of all surgeons. If, now, to the element of resulting deformity be added the uncertainty of recovery and of disease recurrence, then, indeed, there seems to be but little to encourage the lay mind to prompt and decisive action. It is not my intention to utter new nor to echo old homilies on the tendency to procrastination that so often

<sup>1</sup>Read before the New York State Medical Society, February, 1890.

prevents prompt interference in connection with the surgical treatment of localized malignant disease. Yet, it is proper, I think, to express the belief that many lives will be saved, many prolonged, and much mental and physical suffering will be obviated, when the ill-fated who are afflicted with malignant disease are convinced early of the importance of immediate surgical intervention. It frequently happens that patients are not encouraged to prompt action by sentimental physicians and surgeons, so that their worst fears may be temporarily placated. While, perhaps, this course may be wise and humane in some instances, still, a free indulgence in it is calculated to shorten life and increase the death rate in this class of afflictions. Bad news, as a rule, ought to be imparted at once, so that those who are interested may immediately avail themselves of the steps necessary for repair of the breach. The telling of good news may be deferred, since little else may remain than to rejoice. The removal of the superior maxillæ may be properly classed with the formidable surgical operations, since the steps necessary for the removal, and the removal itself, cause a marked impression on the mental and physical tone of the patient. The resulting deformity of feature is mitigated only by the facts that disease is removed, suffering arrested, and that a new lease of comfort and life is executed.

However, let us, without further indulgence in platitudinous delay, interrogate the series of cases here presented. The result of the questionings will not include the name of the operator, the time of the operation, nor the method of its performance. In fact the meagre description of the operative methods, and often the entire absence of any allusion to them, make any deductions thus drawn of no special importance. However, your attention will be directed to the following points in the histories of these cases. (1) The nature of the disease; (2) the duration of the disease; (3) the jaw involved; (4) amount and character of the hæmorrhage; (5) the immediate and remote results of the operation; (6) the recounting of special matters in connection with individual cases.

It is proper to state at the outset that 254 cases have been analyzed instead of 250, as indicated in the title of the paper.



Of this number two only were performed by myself: Your attention will be called somewhat later to the peculiarities relating to these alone. In 230 of the 254 cases one jaw only was removed, leaving 24 in which both bones were excised simultaneously. The nature of the disease for which the operations were performed was largely of a malignant character, the exact varieties and duration of which will not be recited here, but will be found in an annexed table. One hundred and eighty-eight of the 230 cases of removal of a single jaw recovered from the effects of the operation more or less promptly. Thirty-three, or about 14% of this entire number, died more or less soon from either the immediate results of the operation or from the complications and early sequels.

Complete removals of a single jaw are found to have been followed by a death-rate five times greater than after incomplete removals. No consideration is given in this estimate of the comparative death-rate, to the influence exercised by the extent and nature of the disease, nor to the vigorous means necessary to meet the requirements of unusual cases. An examination of the tabulated statement as to duration and nature of the disease will do much toward determining the influence of these elements on the final result.

Primary hæmorrhage caused death in 9 cases, or about 4% of the entire number of single removals. Erysipelas, septicæmia and other complications claimed their share of death's harvest. In 57, or about 25%, of the 230 cases profuse hæmorrhage is reported to have taken place, coming about equally from the facial incisions and from the deeper part of the wound. The sources of this hæmorrhage were from the recognized branches of the facial and the internal maxillary arteries, as can be easily comprehended. In 13 instances, or about  $5\frac{1}{2}\%$  of the entire number, dangerous hæmorrhage is reported, of a primary and secondary nature. It may not be uninteresting to note the facts that the left jaw was involved 110 times, and the right 74 times in the 230 cases. Of the remaining 46 the the histories do not indicate the side involved. However, sufficient facts have been recited to suggest the interesting and probable circumstance that the left jaw appears to be more liable to disease than the right. More deaths are

reported to have followed removal of the right than left maxilla. However, this showing can be scarcely more than coincidental, since similar diseased conditions would undoubtedly be followed by similar results, other things being equal. As before remarked, in 24 instances both upper jaws were removed simultaneously. In these cases not a death is reported to have occurred as the direct result of the operation. This is, indeed, a strange fact, especially when it is recalled that about 14% died from the immediate and consequent effects of the removal of a single jaw. A closer examination of the nature of the disease calling for operation, and of any preparatory steps incident to it, demonstrate nothing to favor the surprising result that attended cases subjected to the double removal, except that in 15 of the 24 cases the removals were incomplete. This is a manifestly important fact for consideration, when it is recalled that in the single cases, irrespective of the disease calling for the operation, the death rate was increased 500% by entire removal. This exhibit would seem to argue that it is safer to remove both than a single jaw, a manifestly irrational statement; it is likewise suggestive of the strangeness of what may be called coincidence, if not also of the questionable worth that can be attached to conclusions deduced from limited statistics. Had it fallen to the lot of any one surgeon to have been able to report such a result from his individual experience, then, indeed, he could rightly claim special skill, as well as good fortune. Profuse hæmorrhage was present in 6 only of the 24 cases, and dangerous hæmorrhage is said to have happened but once. Here, again, are noticed confirmatory facts, when this series (24) is compared with the series of single removals. In the latter profuse hæmorrhage was present in 29% of the cases, while in the former it was present in but 24%. In the cases of single extirpation dangerous hæmorrhage happened in about  $5\frac{1}{2}\%$ , while in the double series but a single case of this form of bleeding is reported. These facts are consistent with, and, indeed, are quite necessary to the brilliant results already reported in the operations of double removal. The date of the recurrence of disease after operation is reported more meagerly than any other of the items. I fancy that this omission is largely due to the fact that pa-

tients soon pass from the observation of the surgeon, and also it not infrequently happens that the operator is so much elated with the immediate results that he, too, loses sight of this, the most important practical element of the case. Before calling attention to the relation of the complications that are found associated with the varieties of the disease that demanded the operation of excision, it will be found to be interesting, I think, to place before you some facts of special character relating to individual cases of the series. This course can but serve to impress that which will be said later as bearing on the special means to be adopted to obviate as far as possible the special causes of death.

The first case is one in which, after removal of the upper jaw for osseous tumor, severe primary oozing occurred, which at the end of ten days was followed by severer secondary oozing from the depth of the wound, that nearly exhausted the patient before the bleeding was controlled, which was done by plugging with styptic compresses. In 1830 Mr. Scott, of the London Hospital, assisted by Mr. Luke, ligatured the external carotid below the digastric muscle before removing the superior maxilla of that side for osteo-sarcoma. The only bleeding points were from the facial of the opposite side, as can be readily surmised.

In 1857 Mr. Bickersteth encountered profuse hæmorrhage after removal of the superior maxilla for an osseous growth. The hæmorrhage was controlled only by pressure on the common carotid followed, after much trouble, by ligature of the bleeding point, thought to be the internal maxillary. Dr. John Ashhurst, Jr., is reported to have lost a patient two hours after operation from shock and loss of blood following the removal of the superior maxilla for a fibrous tumor.

In 1829 Mr. Lizars removed the right superior maxilla for the cure of sarcoma. He ligatured the right external carotid as a preparatory step. The amount of hæmorrhage following the operation is not recorded; presumptively, however, it was small, since no allusion is made to it in the report of the case. In 1835 the same surgeon encountered a case of severe oozing lasting three days, after the removal of the upper jaw for the cure of osteo-sarcoma, which was checked finally by pressure.

Pressure on the common carotid is reported to have been necessary in the case of Liston's to control severe hæmorrhage following the removal of the jaw. Mr. Holmes Coote was obliged to ligature the common carotid to arrest severe secondary hæmorrhage, that occurred on the eighteenth day after removal of the entire upper jaw for the cure of cancer. The patient died two hours after the ligaturing, probably from the loss of blood.

In 1831 Mr. Earle tied the common carotid preparatory to removal of the right superior maxilla for a "fungoid" growth. The amount of hæmorrhage that occurred during the operation is not reported, but the subsequent course of this surgeon in respect to the treatment of the patient warrants the belief that the amount was insignificant, and possibly insufficient, since it is reported that "on the night following the operation the patient was bled to the amount of one pint." This patient recovered. It is possible that George Grabbe, who wrote in 1832, may have heard of this case and was caused by the knowledge of it to write :

Man yields to custom as he bows to: ate,  
In all things ruled—mind, body and state ;  
In pain, in sickness, we for cure apply  
To them we know not, and we know not why.

Mr. A. G. Field tied the common carotid to arrest secondary hæmorrhage taking place on the day following the removal of the upper jaw for an unclassified tumor. The patient recovered.

About 1830 Mr. Lizars tied the common carotid preparatory to removal of the superior maxilla for the cure of medullary sarcoma. Notwithstanding this step, it is reported that the patient lost two pounds of blood. It came from the gums and palate. The reason for this degree of bleeding is assigned to "hæmorrhagic disposition." The patient recovered, but died some months after from return of the disease.

In 1867 Dr. Frank Hamilton is reported to have ligatured the common carotid before removal of a rapidly developing fungoid growth of the maxilla. The amount of bleeding at the time of the operation was inconsiderable, still slight sec-

ondary hæmorrhage happened on the sixth day following the operation.

In 1860, W. H. Gott encountered an almost fatal hæmorrhage following the removal of the superior maxilla for the cure of fibroma. Again in 1871, he performed a similar operation for the cure of sarcoma. It is reported that but "little blood" was lost—about 8 ounces. As a further illustration of the appreciation of some operators of what constitute "a little blood," I will call your attention to the following case operated on by Mr. W. J. Leake, followed by the loss of "a little blood," "about 16 ounces," "no ligatures were required." It might be added that modern comment is unnecessary in connection with such hæmorrhagic statements. Surely, if this be the type of hæmorrhage denominated "little" or "very little", then, indeed, should

Man wants but little here below, nor wants that little long.

In 1856, Detmold tied the common carotid for the removal of the superior maxilla for cure of osteo-sarcoma. Notwithstanding this step, hæmorrhage classed as "fearful" occurred, which was stopped with cautery. In 1869, Ashhurst, Jr., is reported to have lost a patient from the effects of hæmorrhage and shock within a short time after the operation for the removal of a fibrous tumor. In 1874, W. H. Pancoast tied the common carotid to arrest secondary hæmorrhage that followed the removal of the superior maxilla for cure of medullary sarcoma. He was prevented from tying the external carotid on account of the infiltration of the tissue surrounding this vessel.

It will be seen that in the 17 special cases just cited dangerous or fatal hæmorrhages have occurred in all. Osseous tumors are credited with 2; osteo-sarcoma with 3; fibrous tumors with 3, 2 of which died as a consequence; sarcoma 3; unclassified tumors 3; fungoid 2; cancer 1. In these cases the external carotid was ligatured primarily in 3 instances, and all recovered. The common carotid was ligatured primarily 4 times, and all recovered; and for secondary hæmorrhage twice, of which 1 died. It is interesting in this connection to notice the opinion of the late Prof. S. D. Gross, bearing on the ques-

tion of ligature of the *common* carotid as a preparatory measure. "I have never found it necessary in any of my operations upon the upper or lower jaws to secure the carotid artery as a means of preventing hæmorrhage. Indeed, one can but be surprised that such a procedure should ever have been recommended, much less employed by any sensible surgeon." The full force of this remark will be considered further along.

The time that can be properly devoted to the reading of this paper will not permit the writer to defer longer the consideration of the special, immediate and remote results of the operations and the best means of obviating their ill effects. Hæmorrhage and shock will be alluded to only in connection with the immediate results, while deformity of the face and utterance and disease-recurrence will compose the items of the remote results. In connection with shock, due to the operation direct, I can offer no suggestions other than those already well known to the profession. In connection with the prevention of hæmorrhage and its consequent shock, I have no new suggestion to offer, but I have a desire to emphasize one expedient that was carried into effect by Lizars so long ago as 1830, which is preliminary ligature of the *external* carotid, especially when the nature of the growth warrants the belief that profuse or dangerous hæmorrhage will be encountered. This leads me to inquire is ligature of the external carotid a safe operation? Up to the present time this vessel has been ligatured no less than 85 times (8 of which are my own), and in no instance, so far as I am informed, has death or dangerous secondary hæmorrhage followed as the direct cause of the ligature, and in but one—my own—can death be positively ascribed to this operation alone. Since this case is of unusual interest by reason of the origin of the facial artery from the point of bifurcation of the common carotid usually occupied by the superior thyroid, for which it was mistaken at the time of the operation, I will briefly state the case.

The patient was suffering from extensive carcinoma of the lower jaw and floor of the mouth, attended with severe pain and much difficulty in swallowing and speaking. The external carotids were ligated simultaneously. The malignant growth diminished rapidly in size, the pain

ceased, and the ability to swallow and to speak was also markedly improved. On the fifth day following the operation a slough occurred on the right side of the former situation of the submaxillary gland, and extended to the diseased lower jaw. On the ninth day after the operation the patient died from the effects of a hæmorrhage from the seat of the slough.

As implied but a moment ago, the submaxillary gland had been removed some time before the ligature of the carotids, on account of involvement from the primary seat of the disease?

The removal of the gland at the time required the ligature of the facial artery *before* the giving off of the branches that are distributed to the tissues contiguous to it, and for this reason the tissues about the stump of the remaining—the cervical—portion of the vessel depended on other sources than the right facial for their nutrition, and the same can also be said of the extreme end of the arterial stump itself.

In my observations no instance of a similar abnormality of the facial has occurred, nor does anatomical literature, so far as I have been able to ascertain, present a parallel instance.

Surely, such a record as this regarding the ligature of the external carotid, cannot be gainsaid as to safety. In one of the two cases of my own in which the entire superior maxilla and malar bone were removed but a few weeks since for carcinoma involving the entire bone, the external carotid was tied as a preliminary measure. This patient, æt. 69 years, and the growth was very prominent, and extremely vascular. The total amount of hæmorrhage was trifling, coming only from the opposite facial and the anterior palatine branches of the opposite internal maxillary. At the termination of the entire operation, which lasted scarcely an hour, the pulse of the patient was but 74, and a rapid recovery from the operation itself ensued. As to the propriety of ligating the common carotid for the purpose of preventing primary or secondary hæmorrhage in these operations, the results of ligature of this vessel for removal of the jaw will be briefly cited. Dr. Wyeth has reported 38 cases in which the common carotid was ligatured preparatory to or after removal of the superior and inferior maxillæ.

Of this number about nine or about 24% died. When it is noted that the death-rate in 230 cases of removal of the superior maxilla is 12% only, then, indeed, should the preparatory ligature of the *common* carotid for the purpose of this removal be condemned, as it appears that it doubles the death-rate following removal of these bones. These comparative results emphasize most forcibly the wise remarks of Dr. S. D. Gross quoted but a few moments ago regarding the tying of the carotid in those operations.

The deformity of face and of utterance require but a moment's consideration. As soon as the healing is completed, and even before if the disease be not malignant, the services of a dentist should be employed. The introduction of a vulcanized rubber, "plumper" combined with an obturator will be sufficient to almost entirely remedy these defects. The question of disease-recurrence is indeed most important to the patient. It is for the eradication of disease that the unequal fight is made, for as Johnson wrote "where there is no hope there can be no endeavor." As bearing on this part of the subject, I can make but one suggestion, which is as to the influence on disease-recurrence of ligature of the vessels nourishing the region from which it springs. While I do not believe that this step will do much, if anything, toward the prevention of the recurrence, still I do believe that it may defer the event and lessen the rapidity of the growth. If such be the case, then ligature of one or of both *external* carotids, may be said to meet two important practical indications in malignant disease of the regions supplied by these vessels. This brings me to the consideration of the second and last of my own cases which I will submit to you for what it is worth, leaving you to judge whether or not its employment may not at least yield additional hope:

W. B., æt. 22 years, single, printer; family and personal histories good. In 1884 B. noticed the usual symptoms indicative of the existence of a polypoid obstruction of the left nostril. In 1885 the actual existence of such a growth was demonstrated by a medical gentleman, who soon after removed a portion of it with forceps. From this time until 1888 portions of the growth were removed at varying intervals



with forceps and snare; and during this time, too, the extent of the attachment and the nature of the growth were frequently determined. It was a myxo-sarcoma, as determined by microscopical examination. It was attached to the basilar process of the occipital bone, to the posterior and left wall of the pharynx, also to the palate bone and the internal pterygoid plate of the sphenoid bone. In November, 1886, a spontaneous and very severe hæmorrhage occurred from the tumor.

At this time the growth was increasing in size rapidly. A little later a second and severer hæmorrhage occurred; this, too, was spontaneous, and was checked only after the anterior nares and the pharynx were tamponed. In fact, the patient was nearly exsanguinated by this loss of blood. In February, 1888, a third attack occurred at night, which was arrested in the same manner as the preceding. This attack confined the patient in bed for eight days.

On May 5, 1888, the patient suffered more severely than usual from pressure symptoms referable to the hard and soft palate, and also to the supramaxillary and auriculo temporal branches of the fifth pair of nerves. For months before this time, and with increasing severity, pain had existed in the pharynx. At this time the patient could not breathe through the nostrils. The tumor filled the upper part of the pharynx so completely that the index finger could be introduced only with difficulty between it and the right side of the wall of the cavity, and the act was often followed by quite severe temporary hæmorrhage. The pressure of the growth on the hard and soft palate caused a well-marked inferior convexity of these structures, especially of the latter. A small bony spiculum was seen protruding from the inferior surface of the soft palate at the junction of this structure with the hard palate. Anodynes were required at this time to quiet the patient, and often to insure sleep on account of pain and nervous irritation. The appetite decreased; marked and increasing emaciation was apparent. The patient now refused further attempts with the snare and begged for a radical operation—which had been promised him—irrespective of the outcome.

Therefore, on June 19, 1888, the external carotids were ligated simultaneously in the presence of many of the house staff of Bellevue Hospital. The wounds healed by primary union. At the end of a week all pain had ceased and the size of the tumor had diminished to such a degree that not only had the previous bulging of the palate caused by it disappeared, but the index finger could easily explore the dimensions and determine again the attachments of the growth. And, too, these examinations were followed by slight oozing only, barely

sufficient to discolor the finger. On June 28, the left superior maxilla was removed below the orbital plate, thus exposing freely the left side of the tumor; and, although the bone was removed nine days after the ligating of the external carotids, but one arterial spurt of sufficient size to require ligature occurred during the entire procedure, and this was at the situation of the anastomosis of the facial and ophthalmic arteries.

The final step, the removal of the tumor at once, was not done, nor can I now say that I regret the omission, in view of the subsequent developments. The reasons for the non-removal were entirely politic, and foreign to any contingency that was apprehended from the attempt.

The snare was employed again, and also strong injections of carbolic acid. The latter removed portions of the structure of the growth quite rapidly by a process of inoffensive sloughing and disintegration. Finally the injection caused such severe pain that the use of it was discontinued. The patient suffers no inconvenience and no pain whatever from the tumor; and when last seen, two weeks since, it was much smaller and harder than three months before, and handling caused no pain or bleeding.

I intend to watch the retrogression of the growth as long as it may continue, but if any increase of the present dimensions occurs, or if annoying symptoms again arise, it will be removed at once.

It is not my intention to enter into direct or indirect theorizing as to whether or not the circulation of a growth, malignant or otherwise, has to do directly with the development of that growth.

In this case the effects on the pharyngeal tumor that followed ligature of the external carotids were due either to coincidence or to modification of the circulation in the growth. The fact that a rapid diminution of the size and painfulness of the tumor followed ligature is indisputable, and seems to me to remove these results from the realm of coincidence entirely. The fact that the regions occupied by the growth are supplied principally by branches of the external carotids is too well established to entitle it to the dignity of defense. The fact that the lessening of the arterial supply of a vascular growth will diminish, temporarily at least, its size, and consequently the pain due to pressure from it, must also be admitted. As to

the causes for the continued decrease in the size of the growth, I am uncertain. Surely, the establishment of collateral circulation should have long ere this supplied it with a liberal allowance of blood, irrespective of its inherent demand for this fluid. If the cell activity, from malignancy or another reason, had been greater at the onset, the effects of the ligation on it would have been, no doubt, exceedingly transient. It is possible that the use of the carbolic-acid injection and the snare since the ligation has led to continued retrogression of the tumor. However, the snaring had no such effect *before* the ligation, and it is therefore unfair to attribute it to snaring *after* ligation. The early and somewhat liberal use of carbolic acid injections *may* have caused condensation of the tissues of the growth, modified the nature of it, or otherwise discouraged the development; or is the change due to coincidence entirely?

In closing, I submit the following conclusions to your consideration:

1. That excision of the superior maxilla is not a dangerous operation.
2. That, contrary to general belief, excision of both superior maxillæ is not a specially dangerous procedure.
3. That, while dangerous hæmorrhage is not frequent in this operation, still its effects are to be feared more than other result of the operation itself.
4. That removal of the upper jaw for the cure of bony and fibrous tumors, and the removal of naso-pharyngeal polypi is attended frequently with dangerous and fatal hæmorrhage.
5. That ligation of one or both *external* carotids is a safe and commendable procedure when dangerous hæmorrhage is apprehended as the result of operations on the area of their distribution.
6. That ligation of one or both of these arteries may delay the return, and hinder the progress of a morbid growth, if it be developing in tissues supplied with blood by those vessels.
7. That—all things being equal—ligature of the *common* carotid for the purpose of controlling the circulation of the external is unwise, unsurgical and unwarrantable.

8. That complete removals are five times as fatal as incomplete removals of single superior maxilla, irrespective of the nature of the disease and of the side removed.

I append a tabulated synopsis of the 254 cases of excision of the upper jaw referred to in the preceding remarks. In the collection of these statistics, I desire to acknowledge the aid of Dr. G. C. Arnold and Dr. J. F. Erdmann.

# ON THE PATHOLOGY AND TREATMENT OF AGGRAVATED HÆMORRHOIDS.

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**I**n this communication I desire to speak only of the more aggravated forms of hæmorrhoidal degeneration, cases in which a considerable portion, or the whole of the circumference of the anal portion of the rectum has become so diseased that a vascular tumor of considerable size has been formed. In these cases the surgeon has to do no longer with a simple varicose condition of the hæmorrhoidal veins, nor with a fairly well defined and circumscribed polypoid hypertrophy of the vessels and submucous connective tissues, but with a true angioma, which, although on its surface it may be more or less lobulated, in its deeper portion is formed by a continuous network of dilated vessels or cavernous spaces bound together by a varying amount of connective tissue.

The arterial supply of these tumors is very free: they are fed by the terminal twigs of the middle hæmorrhoidal artery which descend to them almost vertically in the submucous coat of the rectum; these arterioles display the same tendency to enlarge which is seen with vascular tumors in other parts of the body, and the result is that in the worst cases a dozen or more dilated arterioles of sufficient size to demand ligation may be met with by the surgeon in the course of an attempt to remove the tumor. The pulsation of these may often be felt beforehand by the finger introduced into the rectum above the growth.

A certain quality of erectility is manifested by these tumors, in common with the more frequent and less aggravated forms

of hæmorrhoids, so that their bulk may vary considerably within certain limits according as they are more or less distended with blood.

These tumors always have a history of many years' development; not every case of neglected piles will develop into such a condition, but wherever this condition does develop there has preceded it a long history of piles that have become more and more aggravated with the lapse of years. In the six cases upon which this study is based, the patients were all in the prime of life, between 30 and 40 years, and in all but one their hæmorrhoidal troubles dated back to their early youth. This latter fact would indicate an original inherent developmental defect in the vascular network at the lower end of the rectum in each case as having been an important element in bringing about the ultimate extreme diseased condition. With one exception these patients were all persons of intelligence and education, careful of their person, not given to excess of any kind and watchful to guard against anything that would tend to aggravate their condition, two were ladies of refinement and culture, two were clergymen, one was a printer and one was a laborer. These facts I mention simply from the corroboration which they give to the probability of the existence of primary developmental defect as a predisposing cause of these extensive tumors

Associated with the angioma proper will always be found more or less œdema and relaxation of the adjacent mucous membrane which go to swell the bulk of the tumor and predispose to its ready eversion through the anus. The sphincters become chronically stretched and weakened, a circumstance which has both its advantages and disadvantages. It lessens the suffering caused by the eversion or coming down of the tumor, and makes it reposition more easy, but it also aggravates the infirmity of the patient since the tumor is no longer securely kept up after it is replaced but quickly comes down whenever the patient stands for any length of time or makes any straining efforts at the anus or there is any abdominal pressure as in coughing or sneezing. This weakness of the sphincter must also be remembered in forming a prognosis as to the results of operations for the relief of these tumors, for a consid-

able lack of power upon the part of the sphincters may still remain after the angeioma has been removed, causing some incontinence and favoring some prolapse of the rectum.

The area of the rectal mucous membrane which is the subject of this angeiomatous degeneration does not extend upwards very far. From an inch to an inch and a half will be found to be its usual limit. The tumor is a superficial one, involving only the mucous surface and the submucous connective tissue, so that it may readily be enucleated from the sphincters. This enucleation is not likely to be complicated by hæmorrhage for the reason that both the afferent and efferent vessels enter or leave the tumor at its upper margin and are confined to the submucous connective tissue coat in which they run.

The size which these tumors may attain is considerable; in one of my cases the mass that was rolled out of the anus by the patient at the word of command was equal to that of a good sized apple, somewhat flattened. In its turgid state, darkly livid in hue, with a fissured lobulated surface covered by bloody mucus, it presented an appearance that might have easily excited fears that it was a malignant growth. The patient, worn out by years of suffering and dribbling hæmorrhage, presented a cachectic look that would have tallied well with such a diagnosis.

During the past eighteen months six cases have claimed my care which properly came within the class of aggravated hæmorrhoids, or hæmorrhoidal angeiomata, which I have so briefly and inadequately described. I submitted them all to excision after the method of Whitehead. It is to the merits of this operation in such cases that I desire to devote the remainder of this communication.

In the treatment of ordinary hæmorrhoids in the various degrees and conditions that they are met with, I have at times had occasion to resort to different devices, finding conditions that I believe are best controlled now by simple dilatation of the sphincter, now by injections of carbolic acid, now by the actual or potential cautery, now by the clamp and cautery, and now by the ligature. It is not infrequent that in the same case I resort during the same sitting to several of these measures. The only one of these methods that would commend itself to me as

desirable to be used in removing the more aggravated hæmorrhoidal tumors now under discussion is possibly the clamp and cautery. The objection to the clamp and cautery is that it necessitates some subsequent sloughing and granulation, and in the extensive removal of tissue required in these case might be followed by an undesirable amount of cicatricial contraction. Portions of the angeiomatous tissue would not be included in the clamp, and their subsequent obliteration by inflammatory fibrous hyperplasia would be uncertain.

The feasibility of removing hæmorrhoidal tumors *en masse* by the knife was first demonstrated on a large scale by Mr. Whitehead, of Manchester, England, who reported to the British Medical Association in August, 1886, that he had, up to that time, beginning in 1876, operated in this manner upon more than three hundred patients without a death, a single instance of secondary hæmorrhage, or one case where any complication, such as ulceration, abscess, stricture or incontinence of fæces had occurred; and further that, to the best of his knowledge, every patient had been completely and permanently cured. His method of operating included anæsthesia, the lithotomy position, preliminary thorough stretching of the sphincters, division of the mucous membrane around the entire circumference of the bowel at its junction with the skin, exposure of the external sphincter, detachment of the pile bearing membrane from the sphincters by scissors and fingers until healthy mucous membrane is reached, pulling down of the separated membrane and hæmorrhoids, and cutting it away by cross incision, with suture of the free margin of the severed membrane, as fast as divided, to the free margin of the skin below, bleeding vessels being twisted as they were divided during the operation.

In January, 1887, Lange, of New York, reported a number of cases in which he had done a similar operation, the technique differing chiefly in that he inserted a row of buried cat-gut sutures between the base of the external flap and that of the separated mucous membrane, avoiding the sphincter and taking care not to penetrate into the rectum. These sutures occluded most of the vessels supplying the hæmorrhoidal region, lessening the trouble from hæmorrhage when the final



ablation of the tumor was done. The pile-bearing portion was then cut away and the free margins of the severed mucous membrane and the skin were sutured together. Lange speaks highly of the rapidity and completeness of the healing process and the comfort of the patient secured by his method of operating.

In 1888, and again in 1889, Marcy, of Boston, published papers claiming a long series of cases in which he had removed hæmorrhoids by excision with excellent results. His technique resembles that of Lange, differing chiefly in that he surrounded the separated pile-bearing membrane at its base by a line of deep double continuous animal sutures applied after the manner of a shoemaker's stitch with a needle pierced with an eye near its point. By drawing this line of sutures sufficiently close, but not closely enough to produce necrosis of the enclosed parts, the blood vessels are occluded and there is no hæmorrhage when the membrane is cut away.

Weir, of New York, has also reported a series of cases in which he has followed the method of Whitehead in excising hæmorrhoids, and gives preference to it, in suitable cases, over other methods.

On the other hand Kelsey, of New York, has severely criticised the operation of Whitehead, pronouncing it "naturally difficult, tedious and bloody," and claiming that the results obtainable by the clamp and cautery were equally good, and obtainable by an operative procedure more simple and ready in execution.

From my own experience I have nothing new to add to the technique; I have worked on the lines laid down by Whitehead; the various steps of the operation I have found to be comparatively easy of execution, but taking much more time than the enthusiastic representations of the Manchester surgeon would have led one to expect. Some of this prolongation of the operation is due of course to the natural inexperience of one who is new to the operation; some is due to the aggravated character of the cases with which I have had to do. Most of the time is used in securing hæmostasis and to have to apply a ligature to twelve or more arterioles in a case has been my usual experience. There has been no special trouble or diffi-

culty about any part of the work, it has been simply time consuming. I have not tried the deep sutures of Lange, nor the buried shoemaker's stitch of Marcy. I shall, I think, test them in future cases with a view to their value in controlling bleeding, and shortening the time required for the operation.

The results, however, have been all that the most enthusiastic partisan of the operation could have claimed for it. A perfectly healthy outlet to the rectum, as far as the mucous membrane is concerned, has been secured to all my patients. The contractile powers of the sphincters in the worst cases, long weakened by constant distension, has, of course, demanded time for its restoration. In only one case, at the end of a year, is there still some lack of power in the sphincteric grip to wholly control the escape of gas or fluids, but in this case the improvement in the general condition of the parts, and the resulting comfort, is so great that the slight infirmity that still persists is regarded as insignificant.

The certainty, the absoluteness and the perfection of the cure are the points which have struck me as most clearly demonstrated in the few cases which I report. The procedure is an ideal one surgically inasmuch as it combines immediate and radical removal of all diseased tissue, with immediate closure of the wound and subsequent union by first intention. I cannot think, however, that it can be called an operation easy of performance—I should say that it was an operation not to be lightly undertaken by one not accustomed to delicate operative manipulations, or without the presence of good assistants, good light, and appropriate instruments. Doubtless, as in the hands of the eminent surgeon who has introduced the operation, natural manipulative aptitude, extensive general surgical training and the special skill resulting from the repetition of the operation hundreds of times, would reduce the difficulties of this operation to a minimum and render it neither tedious nor bloody. It is not, however what the operation would be in the hands of such an operator that is to be considered, but rather what it would be found to be by the operator of average experience and opportunities. My judgment is that in the hands of the latter operator, the operation in aggravated and extensive piles would be found to often

justify the opinion of Kelsey, already referred to, that it is "naturally difficult, tedious and bloody." It ought to be ranked as a major operation. Especially ought it to be ventured upon with caution in the case of patients who are very weak and unfit to be subjected to a prolonged operation, or in whom by reason of renal or pulmonary disease prolonged anæsthesia would be dangerous. The operation is one which appeals much more to the operative bent of the general surgeon than to that of the rectal specialist, and I am not surprised that by the latter class of practitioners it is almost universally condemned. To one, however, who is accustomed to dealing with vascular tissues, to whom the hæmostatic forceps and the ligature are ready and frequent servitors, to whom the preservation of cut surfaces from septic contamination is a thing of easy routine, by whom the coaptation of cut surfaces, subsequent primary union, the avoidance of tissue necrosis and the limitation of suppuration are always eagerly sought for, to such the technical difficulties inherent in the ablation of hæmorrhoidal tumors after the method of Whitehead will seem trivial obstacles beside the ideal perfection of the results to be gained. My judgment is that the operation is based on sound surgical principles and that it is a valuable and permanent addition to operative surgery. The frequency with which it will be resorted to will depend much on the individual surgeon; it will be more frequently employed by surgeons who are doing much general operative work, and I think that I can see in its results qualities that will cause it to be more frequently resorted to, as multiplied experience brings to the operator increased skill.

Certain cautions, however, require to be noted before dismissing this subject. First, I can see how that an operator may readily so injure the sphincter that permanent fæcal incontinence may result. It is by no means an easy thing to always recognize at once the muscular fibres of the sphincter in the first stage of the dissection. This will be the case more especially in the instances of aggravated disease, when the tumor is large and the sphincter flabby, and the additional preliminary stretching at the time of the operation has entirely relaxed it. Unless great care is taken to identify the struc-

tures exposed by the primary incision, and to keep clearly to the inside of the muscle, the operator may find that he has included a part or the whole of it in the mass which he is enucleating; even though he may perceive his error before going very far he may yet have divided important nerve fibrils the section of which may entail permanent loss of power in the muscle. The first steps in the operation, therefore, should be characterized by great care in the identification and avoidance of the sphincter; when the muscle has been clearly identified and drawn aside at a given point, the further enucleation may be done with expedition and without danger to it.

A second caution is to be observed from the side of the tumor. If care is not taken to hug closely the surface of the muscle, and thus to keep outside of the vascular tissue of the tumor proper, the process of enucleation will be less readily and speedily accomplished, and will be attended with an unnecessary amount of venous hæmorrhage. When, however, the sound tissues beyond the tumor have once been reached at any point, the further enucleation may be readily and safely accomplished by pursuing the enucleation circularly around the bowel from this point, and working downward to the anal margin. It is important also that the dissection shall be pushed upward, well beyond the diseased portion at all points, so that the final transverse section of the bowel, when the tumor is cut away, shall be made through healthy mucous membrane. If this precaution is not taken, the difficulties in obtaining final hæmostasis will be much increased. No hesitation need be felt in advancing upward with the dissection as far as may be necessary to find the healthy bowel, lest difficulty should be met with in bringing down the cut end of the bowel and suturing it to the skin. In the aggravated cases, now under consideration, there is always present much relaxation of the rectal walls above the tumor, with tendency to prolapse, and considerable retrenchment of this relaxed membrane is of advantage to have coupled with the removal of the tumor proper in order to secure the most perfect result. On the other hand none of the skin at the anal margin should be cut away, however redundant it may seem to be at the time. When the suturing of the intestine to the skin has been com-

pleted, the line of sutures will be at that time well outside the anus, but as time passes the rectal walls regain tonicity and retract upward somewhat, the sphincters regain their power of contraction and close the anal orifice, drawing in the skin which has become adherent to the surface of the external muscle, until finally the suture line will be found to have disappeared within the anus, and a well marked integumentary funnel leading up to it will have been formed. In anticipation of this, therefore, no cutting away of integument should be done.

Another requisite for the most perfect result is that the retrenchment of the rectum shall be equal on all sides. In one of the earlier cases upon which I operated, after sufficient time had elapsed to bring about the definitive retraction and other changes described above, I found that upon one side the integument was not drawn up as far as on the other, but that, on the contrary, the mucous membrane here, for a limited space, remained drawn down below the margin of the sphincter. I had a veritable ectropion ani. This marred the perfection of the result. For a time I was not able to explain the reason of this satisfactorily to myself, and naturally looked upon it as a result due in some way to the operation, or to some peculiarity of the patient. I have since learned that it was due to neither, but rather to a fault in the way this particular operation was done. In cutting away the diseased tissue, although I had gone through healthy tissue in my incision, I had, nevertheless, followed closely the line of demarcation between it and the diseased tissue, and inasmuch as the extent of the membrane involved in the disease had not been alike at all parts, I had cut away less on one side than on the other. Hence the lack of balance of the two sides, the unilateral superabundance of the mucous membrane, the ectropion. In one other case, operated before my attention had been awakened to this possible defect, I found a similar lack of balance to exist when my suturing was completed. I saw then at once the difficulty, and, without ado, proceeded to cut my sutures and remove more of the mucous membrane where it was too abundant. The final result was perfect.

RECAPITULATION.—I. In the more aggravated forms of

hæmorrhoidal disease the surgeon has to do with a veritable angioma, sometimes involving the whole circumference of the anal end of the rectum.

2. The anatomical relations of this vascular tumor are such as to render possible its enucleation and ablation without special hazard to life, and without involving especially difficult operative procedures.

This has been demonstrated on a large scale by Mr. Whitehead, of Manchester, England, and is corroborated by the experience of many other surgeons.

3. The method of excision and suture is inherently a more desirable operation than other methods involving strangulation of tissue, ulcerative and suppurative processes. It is not, however, so easy or so quick of performance, and demands a greater degree of technical skill and experience for its safe employment.

4. The best final results from the operation can only be obtained by avoiding injury to the sphincter muscle, or to its nerves; by the preservation of all the integument at the verge of the anus, and by the even circular discission of the rectal mucous membrane above the growth.

CONCLUSION.—The operation of excision, though, in the more aggravated cases of hæmorrhoidal tumors, often tedious and bloody, presents no difficulties not under the easy control of ordinary surgical skill; its results are superior to those obtainable by any other means; it is, therefore, an operation to be commended and to be accepted as a permanent addition to the art of surgery.

## ON SYMMETRICAL MANIFESTATIONS OF SYPHILIS.<sup>1</sup>

By W. B. PLATT, F.R.C.S., ENG.,

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THAT manifestations of syphilis are sometimes symmetrical, that is, occur on the right and left side of the body in corresponding places, has long been known, and this fact has been handed down without much further inquiry or comment. I have been able to find little note of the frequency of this peculiarity, and of the character of the skin lesions which are symmetrical. To be able to say that a given syphilide is symmetrical, we must exclude at the outset every variety of trauma, including friction and pressure; otherwise, two ulcers in a syphilitic individual might appear symmetrical, when, in reality, they were so only in the same sense as ordinary marantic bed-sores over the ischial tuberosities. It is well known that trauma is a powerful determining cause of a local outbreak of syphilis, the hyperæmia affording a favorable focus for development.

It seems probable that the symmetry of syphilis may be accounted for by the facts

1. That it is a disease which affects in its course the entire organism, or, at least, may so affect it at different stages of development, showing a tendency to attack different tissues in succession, or else additional ones, the first remaining affected, the last involved having greater resistant power than the first.

2. At any given time, or at different times, the disease selects a given spot or spots (on the skin for instance) on one side of the body which offer exactly the same favorable con-

<sup>1</sup>Read before the Clinical Society of Baltimore. February 7, 1890.

ditions for development as corresponding ones on the other side, and more than any other spot, say an inch further off on either side.

We may take this view independently of the question whether syphilis is due to an organism or to a chemical agent. In the one case we may assume favorable culture and in the other favorable chemical combining conditions.

Take, for instance, case No. 7, where the patient had the bursa patellæ of one leg affected seven months after the other had ulcerated from syphilis. Thus showing symmetry of location but not of time. There are certain diseases of the eye, ear and nervous system where symmetry is often noted. In inherited syphilis where interstitial keratitis occurs it is apt to attack sooner or later both eyes. Choroiditis is usually syphilitic and often bilateral. Middle ear syphilis is usually symmetrical. Syphilitic iritis is apt to attack both eyes, sooner or later. Syphilitic analgesia is always symmetrical (Fournier, quoted by Zeissl).

The following cases, six of which are from Bay View Hospital, and two from the Garrett Dispensary records, illustrate the symmetry of syphilitic manifestation.

CASE I.—*Symmetrical Macular Squamous Syphilide*. White, male, æt. about 25 years. Patient is covered with dark, pigmented, and in places scaly spots, varying in size from  $\frac{1}{4}$  to  $\frac{1}{2}$  inch in size. Has had the eruption since May, 1889.

The spots are markedly symmetrical, about the navel and on shoulders and loins, along the lines of the cutaneous nerves on each side of the spine, 3 to 4 inches. On anterior and inner aspects of legs, half way down, are symmetrical spots. Both patellar regions are remarkably and entirely free from spots. Likewise dorsums of feet. There are symmetrical spots an inch and a half behind the internal malleoli. Below popliteal spaces and to the inner side are symmetrical spots.

CASE II.—*Symmetrical Ulcers of Legs*. Male, æt. 66 years. On anterior aspect of *right* leg, half way down, is an old shining cicatrix 2 or 3 inches long, vertically. On *left* leg, anterior surface, beginning nearly half way down, is a large granulating surface, 8 inches long, vertically, involving the bone which projects in a flat arch from the middle of the surface. This latter condition has lasted 10 months. Palpable post-cervical glands on one side. No supratrochlear glands to be felt. Pa-



tient denies all syphilis. Here we have a healed ulcer on *right* leg. Active ulcer involving bone on *left* leg.

CASE III.—*Symmetrical Ulcers of Legs*. Male, æt. 42 years. Denies ever having had a chancre. Had buboes 6 years ago. Two corresponding, sharp-cut, small ulcers, 4 inches below knees, on inner aspect of legs. Again, ulcers  $2\frac{1}{2}$  inches above ankles on anterior and outer aspect of legs. Again, 2 inches above latter on inner crest of tibia. Chronic indurated glands in both groins. Patient has many small ulcers, irregularly scattered along legs and thighs.

CASE IV.—*Symmetrical Ulcers—Manifestations of Late Syphilis*. Male, æt. 45 years. An old broken-down warrior at Bay View. Sunken-in nose, perforation in hard palate. Patient contracted a sore during the war. Since then he had repeated cutaneous eruptions. Four inches above each ankle are symmetrical, narrow, irregular scars on anterior aspects of legs. These are nearly 4 inches long. At inner end of right cicatrix, and occupying part of its area, is a superficial ulcer an inch and a half in diameter.

CASE V.—*Symmetrical Ulcers—Manifestations of Recent Syphilis*. Healthy-looking young girl, æt. about 22 years, seen at Bay View with Dr. Warfield in the chronic wards. She gave no syphilitic history. The only evidences observed were 2 exactly symmetrical ulcers, 1 on the anterior aspect of each leg, two-thirds of the way down from the knee. These ulcers are about 1 inch in diameter, have sharp edges and are deeply ulcerated. Local applications failed to heal them. They cicatrized rapidly after a short course of mercurials and potassium iodide.

CASE VI.—*Symmetrical Ulcers of Tongue*. M. T. Garrett Dispensary case. Clear history of syphilis. Has sore throat. Gummatous swelling on left temporo-parietal juncture. Both sides of the tongue are symmetrically ulcerated in two places on the edges, the most anterior being about  $\frac{1}{2}$  an inch from the tip. These healed after appropriate treatment.

CASE VII.—*Ulceration of Bursæ Patellæ; Late Syphilis*. M. S., Garrett Dispensary case. Patient applied in the Autumn of 1887 for a swelling over the right patella. This soon ulcerated through the skin, leaving an indolent ulcer, with indurated overhanging edges. There being no history of syphilis, and the edges being almost cartilaginous in hardness, resembling epithelioma, the ulcer with its margin was excised, and the resulting wound brought together as far as practicable, the remainder healing by granulation. A microscopical examination of the ulcer by Prof. Welch, at the Johns Hopkins Laboratory,

showed it to be a broken-down gumma. In March, 1888, a swelling developed over the left patella exactly similar to the previous growth on the right side. This finally ulcerated, leaving a painless excavation going nearly down to the bone. The patient was put upon mercury with chalk, 1 grain thrice daily, and potassium iodide. The leg was placed upon a splint, and the ulcer finally healed after the separation of a tough, gray slough. These gummata undoubtedly arose from the bursæ patellæ.

CASE VIII.—*Symmetrical Ulcers and Bullæ; Manifestations of Recent malignant Syphilis.* Negress, æt. 26 years. Seen January 31, 1890. Patient entered Bay View Hospital with a sore on the genitals. Has also a deep popliteal ulcer. Ten days ago a sore developed on the hand. Then symmetrical sores on both forearms, on ulnar borders 4 inches below styloid processes. The left one developed first, and is now somewhat more than an inch in diameter, circular, with sharp, sloping edges, and about  $\frac{1}{2}$  inch deep. Two inches below left elbow on ulnar margin is an ulcer about one inch in diameter, on right arm, a swelling in the corresponding place. Over the tips of both olecranon processes are ulcers about the size of a cent. On dorsums of feet one inch above junction of first and second toes are respectively a bulla, and an ulcer. Most of these ulcers began as bullæ. One and one-half inches behind both trochanters, are ulcers.

This patient has non-symmetrical ulcers in various other places. The history in this case is of little value on account of the low degree of intelligence of patient, but it appears probable that she had sores upon the genitals as early as Christmas, 1889. She has now an ulceration extending into the rectum from the vagina, and a large ulcer in one popliteal space. There is no doubt of the diagnosis of syphilis.

The patient died Feb. 9, in spite of active treatment and abundant nourishment. At the autopsy, beyond fatty liver or kidneys, nothing important was to be seen involving the viscera. The nervous centers apparently normal.

We believe than no one would deny from these cases that syphilis sometimes has symmetrical manifestations. Since our attention has been especially directed to this subject we have noticed that the tendency is strong to such symmetry. One must not forget that the disease is as truly symmetrical when the lesion appears on one side some time after the corresponding one on the other side, as when both develop at the same

time and a patient observed over a period of months, will often show a symmetry in his syphilis which would escape observation if but one note on this point was made on his case,

We believe these symmetrical cases will be found to occur very largely if not entirely in the eye, ear and in the skin and its appendages, also in the tongue. Inherited syphilis is notoriously bilateral, affecting the corneæ, teeth, etc., while syphilitic lesions of bone, muscle, periosteum and of the central nervous system may be sometimes symmetrical; they are certainly not commonly so.

We have then a tendency to symmetry in the lesions of syphilis so strong as to constitute one of the most constant of its characteristics.

In the earlier manifestations of the disease, we find the symmetry extends as well to time as to place. Later, the corresponding parts are still affected, though more frequently at different times. In the very earliest of syphilitic skin affections, where the eruption is scattered profusely over the entire surface of the body, it is hardly proper to speak of symmetry when scarcely any part remains unaffected.

Where the diagnosis of a given, local non-traumatic, surgical lesion is doubtful we should always examine the corresponding point or tissue upon the other half of the body for a beginning or a past evidence of syphilis.

# CASES OF CUNEIFORM OSTEOTOMY FOR RELIEF OF DOUBLE CONGENITAL EQUINO- VARUS.<sup>1</sup>

BY VIRGIL P. GIBNEY, M.D.

OF NEW YORK.

SURGEON IN CHIEF TO THE HOSPITAL FOR RUPTURED AND CRIPPLED.

THE patient, a lady, æt. 32 years, referred to me by Dr. Henderson, of Kingston, Ontario, in the early part of Dec. 1887. When she presented herself, I had great misgivings as to the possibility of affording her any relief. In the first place, she had been subjected to the usual method of treatment ineffectually carried out; she had been seen by distinguished surgeons in this country and Canada. Indeed, her father was a physician who stood high in his part of the country. She walked on the outer borders of her feet, where large callosities had formed, serving as a base of support. The soles of the feet looked backward and upward, and her gait was especially reel-like; that is, she wound one foot over the other in locomotion. The shoes were the conventional style for club-footed people. Handicapped as she was, she had for a long time supported herself by teaching music. The soft parts of the tendo Achillis on each side were extensively marked by cicatrices, the results, she told me, of extensive sloughing after an operation for tenotomy in Philadelphia, when quite a child. The head of the astragalus could be distinctly felt, and it was quite impossible to correct the deformity, even to a small extent, by any kind of manual force employed. An extreme degree of talipes equino varus was present.

Her age prevented her admission to the Hospital for the Ruptured and Crippled, and I decided to operate in a boarding-house, selecting my date December 26, 1887. I was assisted by Dr. Chas. T. Poore of

<sup>1</sup>Read before the Orthopædic Section of the New York Academy of Medicine, February, 1890.

this city, and Dr. E. E. Josselyn, now of Philadelphia. The following are the details of the operation:

An Esmarch bandage was applied. An incision over the outer side of the right foot, extending from a point about in front of the tendo Achillis, forward and above the callosity or bursa to the extent of three inches. From the middle of this incision another was made at right angles, extending over the dorsum of the foot and reaching to the inner side of the head of the astragalus. The perineal tendons were dissected away, and a ligature thrown about these in order to drag them from the site of the operation. An incision then made through the other soft parts down to the os calcis, from which, toward the distal end, a wedge-shaped piece of bone was removed by means of the chisel and mallet. The base of the wedge was one inch. My attempt, it will be seen, was to perform Dr. Poore's operation. Another wedge was then taken from the neck of the astragalus corresponding in line with the wedge from the os calcis. After complete section had been made through these parts, it was impossible to bring the foot around in position by manual force. The tenotome was inserted just below the inner malleolus, and the deltoid ligament freely divided. The foot yielded a little, some points of plantar fascia were divided subcutaneously with still a little gain. Failing, however, to get the foot where I desired, I made a free incision on the side, dividing muscles and tendons after the manner of Dr. Phelps. I was still unable to bring the foot into proper position, and the astragalo-scapoid ligament was divided quite freely. After a little more removal of bone and free incisions through the cicatricial tissues over tendo Achillis, in the oblique direction, feather style, I could bring the foot into very good position. On removing the Esmarch bandage, it was found that no important vessels had been severed, and ligatures were not required. The wounds were coaptated, and deep wire and superficial silk sutures were employed. The foot was placed in a Thomas club-foot shoe, which consists of a side steel or iron bar, extending from the upper part of the calf down over the heel to the ball of the foot, each end of which is fastened to a plate which fits the calf and the foot. Over this, plaster of Paris was used.

The operation was completed by the latter part of the afternoon, and at 10 o'clock P. M. she required morphia, and it was noted also that there was considerable oozing through the dressings. It may be necessary to state that attempts were made to secure antisepsis in every stage of the operation. Her temperature next morning, the 27th, was 101, pulse 90. It was necessary to remove the dressing by reason of the extensive oozing, but on removal no vessels were found bleed-

ing. The parts were secured by the Thomas shoe in very good position. On December 30, I found it necessary to put her in charge of a trained nurse, and from this time to February 16, she suffered from a pretty severe attack of septicæmia. Her highest temperature was 106 during this interval. The foot required rather frequent dressings, but, on this date, the 16th, it was noted that the wounds were healing quite rapidly, and that the foot was in excellent position.

The patient up to this time had decided not to have the other foot operated upon, but she began to be encouraged, and, on February 22, having secured her admission to the hospital notwithstanding her age, I operated upon the second foot, assisted by Drs. Wm. T. Bull and the house staff. No Esmarch bandage was applied. An incision was made along the outer side of the foot beginning near the insertion of the tendo Achillis and extending to a point about one inch beyond the articulation of the cuboid with the os calcis. The tendons were drawn out of the wound as on the former occasion, and a wedge-shaped piece of bone removed from the os calcis, the base of which was about  $1\frac{1}{4}$  inches. A wedge was likewise taken through the neck of the astragalus, encroaching very closely upon the joint surfaces. An attempt was made to get the foot into position without succeeding. An incision was then made on the inner side, and all the strictures that could be felt were divided. It was still found that not enough bone had been removed, so that the wedge was made wider by encroaching upon the cuboid. After this procedure we were enabled to get the foot into good position. The foot was dressed antiseptically, a plaster-of-Paris bandage applied, and, on the 24th, it was noted that her temperature up to the present time had not reached 100. Indeed, the wound healed very nearly by first intention. She suffered very little. The progress to recovery was uninterrupted. There did remain, however, on both feet, fistulous sinuses, from which bits of necrotic bone were removed from time to time. When she began to walk the soles of her feet were found so tender that it was necessary to protect these with pads, and slight pressure would seem to cause sloughing. The case was further complicated by a row of corns or bunions on the outer side of the foot, and complete recovery was very much delayed.

Since the summer of 1888 she has been actively employed teaching in the hospital, is regarded as quite an accomplished organist, and the use of her feet and limbs on this instrument has contributed no little to the development of her muscles. Her gait at present is modified very much by the condition of her corns. I have recently had a cast

taken of the feet, and lasts made, over which her shoes are built. With such precautions she gets on with very little difficulty.

The second case was reported in the *New York Medical Journal*, April 17, 1886, page 430, as one not having improved under forcible restoration under ether. One foot was operated upon May 16, 1886, in the basement of a flat, and the other foot about six months later at the Polyclinic. No untoward symptoms followed after either operation; he made a good recovery, and, when I last saw him, two years ago, the feet were in excellent shape, and he was walking in ordinary leather shoes without any apparatus. His mother reported to my friend, Mr. Fitzhugh, a medical student who attempted a few days ago to look the case up, that his feet continued in good position up to the time of his death, which occurred quite recently from scarlet fever.

## EDITORIAL ARTICLES.

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### DELBET ON DRAINAGE OF THE PERITONEAL CAVITY.

Dr. Pierre Delbet, in the *Annales de gyn. et d'obstet.* Feb , 1890, calls attention to the changes of opinion in regard to the subject of drainage of the peritoneal cavity, in the past twenty years. Gynæcologists noticed after laparotomies that the cul-de-sac of Douglas sometimes became the seat of a collection of fluid, and the idea naturally suggested itself of using drainage, where such collections were feared, to prevent their formation. Peaslee advised such a procedure. In 1867 Koeberlé described the glass tube which bears his name, and which was adopted with slight modifications by Spencer Wells, Atlee and others. Marion Sims, noticing that almost all the deaths were due to septicæmia, and that an altered exudate was found in the peritoneal cavity, advised drainage through the cul-de sac by the vagina in all cases of laparotomy. He made a great many proselytes among the German surgeons, Nussbaum and Olshausen being of the number. A better knowledge of antiseptic principles demonstrated that exudations were not dangerous while they remained aseptic, and also demonstrated the danger of admitting septic matter by the vagina. Bardenheuer championed preventive drainage in all cases, but his arguments were ably refuted by A. Martin.

The question of drainage only comes up to-day in a special class of cases, and in regard to its utility the author made the following experiments:

*Cadavre* opened as in a laparotomy and abdomen filled with water. A drainage tube placed in lower angle of wound, taking care that its extremity did not touch the walls of the pelvis. Glass and rubber tubes used successively with and without lateral orifices. The tube in place, the abdominal wall was closed about the tube, and pressure was



made on the abdomen in order to bring about a condition resembling normal abdominal pressure. Very little fluid escaped and none by the tube. If the tube was moved about and raised up and down quickly a jet of fluid escaped and rose to a slight height, but it stopped abruptly as it began. The failure to drain seemed to be due to the stopping of the tube's openings by the loops of intestines. In order to determine if this phenomena was present in the living, the experiment was repeated on dogs. In these animals the muscular layer in the intestine attains a much greater development than in man, and when it contracts the canal is almost as hard as wood, so that there would be much less chance of its obstructing the tube than is the case in man. The same condition was observed in dogs as in the human subject.

If the same thing happened in the living subject after laparotomies, the author was at a loss to account for the reddish serous flow that is so often observed. In order to solve this problem the following experiments were made:

A glass tube was placed in the cul-de-sac of a small living dog June 3, 1889. Two days later 50 grams of an aseptic saline solution were introduced into the abdominal cavity. Nothing returned by the tube. Fifty grams more injected. Nothing returned at first, but the animal made an abrupt movement and the liquid escaped by the tube. From this time at each new injection the liquid escaped from the tube. The animal was killed and tube found to be surrounded by false membranes through which there was a slight fissure. It was naturally assumed that the tube had been completely shut off from the peritoneal cavity, thus preventing the return of the fluid until the animal had, in making the abrupt movement, enabled the adhesions to become separated. Forty-eight hours after a rubber tube was placed in the peritoneal cavity of another dog; 150 grams of liquid was injected through a canula; nothing returned by the tube. An immediate autopsy showed the tube completely surrounded by epiploon but there were no false membranes.

On June 5, a glass and a rubber tube were introduced into the abdomen of a large dog. Fifty grams of a salt solution were injected by the rubber tube, but nothing returned. Upon injecting fifty more

grams the fluid returned by the glass tube, but not by the rubber one, although force had been used with that injection. A hundred grams were then injected by the glass tube, and the liquid returned through the glass tube, but nothing was seen to pass the rubber tube. Two days later an injection was made through the rubber tube; the liquid immediately returned, but only by the glass tube. During the night a yellowish, serous fluid passed in considerable quantity through the glass tube. The animal was killed the next day, and the autopsy showed that the two tubes were completely isolated from the peritoneal cavity. They were in a cavity formed by the adhesions of loops of intestines.

The spontaneous discharge, which was abundant, did not come from the peritoneal cavity, but was from the exudations from the false membranes constituting the accidental cavity.

A glass and a rubber tube were placed in the peritoneal cavity of a dog, June 6. The following day 100 grams of salt solution were injected by the rubber tube; nothing returned. On the 8th the animal was killed. The tubes were enveloped by epiploon. No adhesions. Eight experiments were made with rubber and glass tubes and iodoform gauze to determine how long before the tubes were shut in by adhesions. It is unnecessary to go into details, but it is sufficient to say that all antiseptic precautions were taken, and the peritoneum was in all cases healthy. It was determined that at the end of forty-eight hours the sequestration was almost completed if the epiploon did not shut in the tubes. Moreover, it sometimes happens that the tubes are partially or completely closed by fibrinous coagulations. The following conclusions are drawn from the above experiments:

The ability of the tubes to drain depend upon several things. Coils of intestine may come in contact with the openings and prevent drainage. The tubes may be obliterated by coagulated fibrin (capillary drains are not open to these objections). Adhesions are rapidly produced even about aseptic drains, and shut them off from the peritoneal cavity.

Cases complicated by ascites are not considered in this connection. The deductions drawn from the experiments mentioned are not en-

tirely theoretical in their scope, as both Polk and Hunter have cited cases where the lateral openings of the tubes were occluded by omentum.

The author asks if these experiments should carry the conclusion that drainage of the peritoneum was of no avail. He thinks not, but suggests that the good effects may be due to the rapid development of adhesions which isolate suspected points and make the danger extra-peritoneal. But these adhesions, which are perhaps the reason for its efficiency, may prove themselves dangerous.

*Objections to Drainage.*—That it retards the cure, which can not be said of cases where the tube is not left longer than 24 hours, and where a temporary suture is placed, at the time of the operation, to be tightened later.

That drainage favors septic infection, or does not guarantee the evacuation of serous fluid, even when an aspirating force is used.

That the tubes can wound and even perforate the viscera. The lower part of the rectum, being fixed, may suffer from these mishaps.

That the tube favors the later development of hernia. This danger is greater when very large tubes are used.

That the drain may cause peritonitis. If this objection is restricted to the local adhesive inflammation it is just, but that it can give rise to it, except as a means of admitting fresh infection, is doubtful, and the author does not remember ever to have seen it occur in animals.

That drainage is a factor in causing adhesions.

The author states that a drain left in the abdomen of animals 48 hours, particularly of dogs, is almost always surrounded by adhesions. This is so in cases where it is observed in autopsy or secondary laparotomy, but in these cases the regular evolution of events is interfered with. Coe's case where a tube was removed soon after an operation and a canal was found so perfect as to hold water which was poured in it is one of the best proofs offered for the above statement. These adhesions may bring with them persistent pain, intestinal obstruction, although we do not know whether they increase or diminish, persist or disappear. Munde reports a case where the tube seemed to act as an exciter of reflex vomiting.

The methods of drainage are classified according to the road of drainage and the material used.

*Vaginal drainage* has been recommended in the past, but is now rarely used except after operations by the vagina, either hysterectomy, or the removal of the tubes or ovaries. The advantage of the cul-de-sac being the the most dependent point is offset by the fact that fluid in front of the broad ligament may not be influenced. It is necessary to exercise great care to avoid infection by the vagina. A. Martin sometimes employs vaginal drainage after operations where there is a large amount of tissue that must break down. He encloses the suspicious territory it by sutures to a drainage tube which communicates with the vagina, so that the material is shut off from from the peritoneal cavity.

*Abdominal Drainage.*—While there are many kinds of drains employed they may all be divided in two classes. One class includes the simple tubes through which the liquids are forced simply by abdominal pressure. The other class utilizes a special force, capillary attraction.

*Drainage by Simple Tubes.*—They are made of glass, hard and soft rubber and metal. They differ in length and in diameter. Some have lateral perforations and some, as that of Sims', have a double current. The author agrees with Mikulicz and Loebker, who object to the tubes because they do not insure evacuation of fluids. During the first hours after an operation if the intra-abdominal pressure is feeble, as one often finds it, the patients immobilize their diaphragm and breath after the superior costal type and there is no reason for fluids to flow out through the tube against gravity. If the intra-abdominal pressure is notably superior to atmospheric pressure, the coils of intestine press about the tube and obliterate partially, or completely, its orifices. In fact, during the first hours the tubes work badly, or not at all, and at the end of 48 hours they are surrounded by adhesions, or often obstructed by fibrinous coagulations. Gynæcologists, having for sometime noticed the inefficiency of the tubes to drain where the only force was abdominal pressure have sought to increase the value of this force by diminishing pressure on the outside by means of the syphon or by the syringe. The objections to the former are that it is difficult to preserve rigid antisepsis, and it easily becomes disarranged. Aspiration made

by means of the syringe and a rubber tube has been employed by some surgeons every three hours. To test the utility of this means the following experiment was made: A litre of water was injected into the abdominal cavity through a canula. By the same canal aspiration was made by means of a syringe; not a drop returned. The canula was replaced by a metallic tube, 4-5 mm. in diameter with lateral perforations 4-2 mm. and 6 mm. apart. Only a few grams could be drawn by aspiration. A glass tube 1 cm. in diameter with lateral perforations 4-3 mm. and 13 mm. apart was introduced by another orifice. Only a slight amount greater than before could be withdrawn. In using the two tubes spoken of Dr. Delbet attempted in two cases to withdraw injections from the abdomen, in one case of a litre and in the other of 1500 grams. After more than twenty attempts without any result the abdomens were opened. In the true pelvis of one case there was about 100 grams of fluid. In the other there was removed with a sponge more than 700 grams of fluid. In the first case the great omentum was disposed in a peculiar manner. The doctor thinks that these experiments show that we cannot rely on aspiration to procure drainage.

*Capillary drainage* was the idea of Hegar and was described by Kaltenback in 1881. Hegar used an enormous tube (Bauch's speculum) 3 cm  $\times$  3 cm. in diameter and 18 cm. long, by which he could look into the abdomen. He filled it with iodoform gauze. Subsequently he abandoned the use of the speculum and used only the gauze. Kehrer employs a smaller tube of rubber or metal and replaces the gauze by wicks of cotton. To facilitate the changing of the wicks he proposes the use of a double canula similar to that used in tracheotomy. The relative value of gauze and wicking have been discussed. Gersuny objects to the gauze because particles may drop off, or its meshes may become penetrated by tissue. Chroback has sought to demonstrate experimentally the value of the wicking, but the gauze is used by the majority of gynecologists and has given satisfaction. In 1886, Mikulicz proposed the following method of drainage: "I take a piece of iodoform gauze (20%) the size of a large handkerchief, to the middle of which is stitched a strong piece of aseptic silk thread. They

are placed before the operation in 5% phenol solution. When used the gauze is arranged in the form of a pouch so that the silk thread is within and its free extremity issues from the neck of the pouch and its other extremity is fastened to the bottom. The bag is thrust by means of curved forceps to the bottom of the pelvis and is filled with strips of iodoform gauze in such a way that its walls are everywhere in contact with the wound. The thread fixed to the bottom of the bag is drawn on when it is desired to withdraw the drain.

Mikulicz advises using this method in cases where there is a large space of moribund (?) tissue where it is impossible to suture the sides together. The principal is that adhesions are formed about the gauze and the objectionable area is cut off from the peritoneal cavity. The following advantages are claimed by Mikulicz: The sac of gauze acts as a tampon. It drains the pelvic wound in a simple and perfect manner by utilizing capillary attraction. It maintains the cavity aseptic and shuts off infection from the peritoneal cavity.

To day many surgeons adopt a method which is neither that of Kehrer nor that of Mikulicz. They place strips of gauze so that one extremity rests on the point to be drained and shut off, and the other rests in the lower angle of the abdominal wound. Hegar formerly placed the iodoform gauze in the tube. Pozzi placed the tube in the center of a mass of gauze. Hegar renounced the tube as more injurious than useful. Others, however, continue its use. It is claimed that the gauze introduced directly into the cavity is pierced by tissue which insinuates itself into its meshes, and it does not prevent the orifice through which it passes from retracting. For these two reasons it is sometimes difficult to withdraw it and there may be a slight hæmorrhage in so doing. Delbet does not attach much importance to these arguments. The opposite method of putting the tube in the gauze is thought by M. Pozzi and also M. Routier to have advantages. Sometimes when the gauze is removed there is seen to immediately follow it a considerable quantity of fluid. This happened in a case of Kuster, but Mikulicz imputed it to faulty *technique*, claiming that the gauze had not come in contact with all parts of the wound and the fluid came from a diverticulum. Moreover the too narrow

orifice had in some way compressed the gauze and prevented the filtration of liquid.

The author thinks that Mikulicz may be correct and urges that care be taken to follow his warning, *i. e.*, that the gauze should come in contact with all the wounded surface and that the exit of the gauze should be large enough for it to perform its function. As to the importance of using a tube in the gauze, we regard this as prudent. In case one wishes to use the gauze to check hæmorrhage the tube is an objection. The author concludes this portion of his paper with the following conclusions :

1. That the only method of drainage which permits evacuation of fluids during the first hours after operation is capillary drainage.
2. That all the drains are rapidly surrounded by adhesions which render extraperitoneal the tissue about them. This is perhaps the reason for their efficacy.

We defer criticism in regard to Dr. Delbet's work until we have the second portion of his paper before us, and while the experiments are open to some question yet they are instructive and exceedingly interesting.

A. H. BUCKMASTER.

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#### BARLING ON CARCINOMA OF THE BLADDER.

In the *Birmingham Medical Review* of March, 1890, Mr. Gilbert Barling presents a study of carcinoma of the bladder based on 74 cases and specimens. He accepts two classes of carcinomas, the squamous-celled, or epithelioma, and the alveolar, the former out-numbering the latter by nearly two to one, the actual numbers being 47 and 27. The epitheliomas are made up of epithelium, the general tendency of which is towards the squamous condition, with marked productions of the cell nests of epidermic globules so characteristic of its growth when it exists in other parts of the body, whilst there is hardly any attempt at the formation of fibrous tissue alveoli. Such growths are doubtless derived from the superficial layers of epithelium, which approximates to the squamous kind.

The alveolar carcinomas differ histologically from the former by their

having, as their name implies, a definite alveolar formation, the walls of which are made up either of fibrous tissue or involuntary muscle fibre, enclosing epithelium varying greatly both in size and shape. The variation in shape may be from spheroidal to columnar and from columnar to squamous with an attempt at formation of cell nests, all these varieties possibly existing in the same growth, but the spheroidal appears to be the usual type of the epithelium.

Epithelioma is most commonly found as an ulcer with a shreddy surface, and with raised, everted and indurated border; sloughing masses not yet completely separated are seen clinging to the surface; or it may exist as a raised patch with shreddy or papillary surface, the thickest part being at the centre, the indurated edge and ulceration being absent. Rarely there may be no distinct tumor, but hard discrete nodules scattered over a limited area of the mucous membrane. Whichever of these conditions prevails the attachment to the mucous membrane is nearly always sessile.

The site involved varies in extent from the size of a florin to the size of the palm of the hand, or the growth may be diffused over almost the entire cavity, but it most commonly comes under observation as a patch about three inches in diameter—that is in fairly advanced cases.

In not a few cases the surface is villous or papillary, the processes being from a quarter to three-quarters of an inch, and so obscuring the condition of the growth as possibly to lead to mistake as to its real nature. Of forty-five cases where this point is alluded to, fourteen are spoken of as villous or papillated, apart from those whose surface was shreddy from partial destruction of the tumor.

In all forms of carcinoma, as indeed in most of the other tumors, though not to the same extent, deposits of phosphates occur on the surface of the growths with some frequency, and occasionally these salts may aggregate into a calculus of considerable size, lying on and partly enveloped by the superficial parts of the tumor. The recognition of these by the sound may cause the co-existence of a growth to be overlooked.

If the bladder be divided into three segments, at least two-thirds of the epitheliomas will be found to have commenced in or to have in-



volved the lowest segment, whilst a few will be found diffused over nearly the whole mucosa, and rarely is the growth limited to the vertex.

Many bladder-carcinomas run their full course without contaminating the glands at all; if infection does occur, it is very tardy. Out of 26 cases of epithelioma, in which complete post-mortems were made, in only three is there mention of extension to neighboring parts, once to the vena cava and twice to the tissues of the pelvis. In eleven cases, only, were secondary deposits found either in the lymphatic glands or in some distant part of the body, but it is curious that in only one instance were glandular and general infections associated. Possibly, however, more careful examinations in the future will show glandular infection to be more frequent, as has been demonstrated in epitnelioma of other parts of the body when attention has been specially directed to this point.

The glands were infected in six cases as follows—three times the lumbar, twice the aortic, once the iliac as well as the aortic, and once the abdominal. General infection occurred also six times, thrice in one or both kidneys, once in the lungs and liver (the lumbar glands being also involved), once in the lung only, and once in the radius only. How long a time elapses before secondary infection occurs after the growths have once started is to some extent conjectural, but it is almost certain that it does not happen until a late period. Symptoms may point to the existence of an epithelioma for two to three years or even longer, and yet a careful *post-mortem* reveals neither glandular nor general contamination. It is equally true that after a few months symptoms only, both forms of secondary invasion may be found, but it is quite certain that a growth may exist and arrive at considerable magnitude without any clinical evidence of its presence, so that it would be misleading to date the origin of all tumors from the commencement of symptoms, and equally misleading to conclude that secondary invasion may occur in a few months.

The average time for the destruction of life by epithelioma of the bladder, when not interfered with by operation, is three years. Males are attacked more frequently than females in the proportion of 5 to 1. The age most commonly affected is from 50 to 60 years.

Alveolar carcinoma as a rule involves a wide area of the bladder walls. The locality most often affected is the base.

Only once is mention made of perforation of the bladder coats by an alveolar carcinoma. Extension of the growths to neighboring parts occurred only three times in fifteen cases where a complete examination was made after death; once this was to the urethra, once to the vesiculæ seminales, and once to the innominate bone. In the same fifteen cases secondary formations were found nine times, that is in 60%, which is a decidedly higher rate than in the epithelioma; moreover, in five of the nine both glandular and systemic infection had occurred. The glands involved were the iliac twice, the mesenteric twice, the sacral once, the lumbar once and the "abdominal" glands once.

The viscera infected were the liver five times, once in association with the peritoneum and once with bones;—the kidney once, and the skin and dura mater once. Without doubt secondary infection occurs earlier in alveolar than in squamous celled carcinoma, for whilst the average duration of life from the commencement of symptoms in the former is probably less than two years, in the squamous formation it is three years; yet we find a higher rate and a more extensive diffusion of secondary invasion in the alveolar growths. As with the epitheliomas so with the alveolar tumors; more of them arise between the ages of 50 and 60 than in any similar period; whilst between the fortieth and seventieth year, sixteen out of nineteen were produced. The liability of the male sex to be attacked rather than the female is as great as in the epitheliomas.

Carcinoma of the bladder gives rise to those dilative and suppurative changes in the kidney so commonly due to anything which interferes with the functions of the organ. I find in 49 cases of carcinoma, when the condition of the kidneys is described, that 33 suffered from hydro- or pyo-nephritis or from both combined. Rarely calculus in the kidney accompanies a tumor in the bladder, but the association is probably an accidental one.

The first, and for some time the only, symptom of carcinoma, may be intermittent painless hæmorrhage, which is quite distinguishable from that produced by papilloma. In 64 cases of carcinoma I find

hæmorrhage to have been present in 55, while in 47 it was the *first* symptom.

The most certain means of differentiating between innocent and malignant tumors is by the use of the cystoscope. The presence of a pedicle in some cases, the delicate papillary tufts even, if the growth be sessile, and, generally, the solitary condition of the tumor, point strongly to papilloma. In the case of a carcinoma, the sessile attachment, the nodular appearance, the puffy œdematous condition of the mucous membrane around, and in some cases ulceration, all help to make up a characteristic picture.

Four cases are detailed in which resection of portions of the bladder for malignant growths have been done by Clarke, Sonnenburg, Antal and Guyon, respectively. From the study of these cases, and the results of experiments on dogs, the author formulates the following conclusions :

1. The hope of cure by excision, of malignant growths in the bladder lies in early diagnosis, before the growth has attained considerable size, before the patient's powers have been sapped by repeated hæmorrhage, and before secondary obstructive changes have taken place in the kidneys, and before secondary growths have occurred.

2. For those rare cases in which the vertex and its neighborhood is the seat of growth, Antal's extra-peritoneal method should be followed, if possible. By it about half the bladder may be removed, but the greater the amount resected, the greater the difficulty in stripping the peritoneum and in subsequently closing the opening. The peritoneum is of considerable thickness here, and is apt to strip up some of the external muscular coat with it, especially if chronic cystitis has existed. The peritoneum is much more easily peeled off when the bladder is full than when it is empty. The edges of the wound in the bladder should be closed as completely as possible by suture, especially at the angles, and the reflected peritoneum must be carefully fixed in apposition to the remnants of the bladder walls. When the resection has been so extensive that the bladder cannot be closed its edges should be stitched to the skin wound, and the bladder cavity closed, later, by plastic operation.

3. When the intra-peritoneal plan has been followed, the peritoneal wound must be carefully closed with Lembert's suture, and the remaining part by ordinary interrupted suture. If this be not possible, the part of the wound outside the peritoneum should be stitched to the abdominal wall.

4. Silk is the best material for suture, and it should carefully exclude the mucous membrane.

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#### RECENT CONTRIBUTIONS TO THE OPERATIVE RELIEF OF INTRACRANIAL CONDITIONS.

1. *Lucas Championnière*.—Trepanation pour hémorrhagie cérébrale; Série de Trépanations pour Accidents Divers. Par le Dr. Just Lucas Championnière, Paris.—*Journal de Médecine et de Chirurgie pratiques*, October, 1889.

2. *Cheyne*.—Case of Abscess of the left Temporo-sphenoidal lobe. Trephining. Recovery. By W. Watson Cheyne, F.R.C.S., London.—*British Medical Journal*, February 1, 1890.

3. *Milligan and Hare*.—Abscess in the Cerebellum. Trephining. Death. By Messrs. W. Milligan and A. W. Hare, Manchester.—*British Medical Journal*, February 1, 1890.

4. *Williamson*.—Multiple Cerebral Abscesses. Trephining. Death. By G. S. Williamson, Newcastle on Tyne.—*British Medical Journal*, February 1, 1890.

5. *Sheen*.—*a*. Huge Cerebral Abscess of Traumatic Origin. Trephining. Drainage. Death.

*b*. Brachial Monospasms with Jacksonian Epilepsy. Exploratory Trephining with Negative Results. By Dr. Sheen, Cardiff.—*British Medical Journal*, February 1, 1890.

1. *Dr. Lucas Championnière* reports thirty cases of trephining for the relief of various conditions, without a death or serious wound complication. The wound in the cranial wall left by the trephine does not cause the inconvenience which might be expected and there is no need of any protective appliance subsequently. For this reason he thinks that there is little importance to be attached to the reimplantation of the osseous discs. He makes the further point that in almost all affections of the meninges and of the brain the relaxation and depletion which is caused by the opening of the cranium can act only favorably, which

fact explains why, in many cases, where the seat of the lesion has not been reached, improvement has nevertheless been accomplished. Championniere has accordingly trephined in the following classes of cases:

*Vertigo and headache.*—Four patients, nine operations. Two patients were absolutely and permanently cured; one case trephined four times, is in a satisfactory state; one case trephined three times, has been much improved and has remained so for nearly two years. He is almost free from pain when he does not drink

*Violent pain consecutive to blows upon the cranium.*—Two cases; permanent cure.

*Incomplete hemiplegia with epileptiform crises.*—One case; very great amelioration after the removal of a cranial hyperostosis.

*Hydrocephalus.*—One case with only temporary improvement.

*Epilepsy following fracture of the cranium*—Four cases, all of whom have been either improved or cured immediately. Positive data as to the ultimate results has not been obtained in all.

*Epilepsy, idiopathic.*—Eleven cases; the results were quite encouraging. All the cases were of a grave character; trephining was done without opening the membranes; in none was harm done; three cases were apparently cured, three were greatly improved.

*Cerebral hæmorrhage, ancient.*—One case, a man, æt. 53 years, primary attack of cerebral hæmorrhage twenty months before, leaving behind paresis of the right leg, marked limp, slight difficulty in speech, very marked contracture of the right hand, and epileptiform attacks, which latter were becoming worse. A diagnosis was made of a hæmorrhagic focus near the middle of the ascending frontal convolution, irritating the arm centre, the speech centre and the leg centre. As this man, being otherwise in good health, could not long survive on account of these sequelæ, an operation was determined upon to expose the clot and free the compressed and irritated parts. The operation was done February 7, 1889; cranium was trephined over the middle of the fissure of Rolando; orifice was enlarged till it measured  $1\frac{1}{2}$  by  $2\frac{3}{4}$  inches in extent; the dura mater having been reflected, the large vein which runs along the fissure of Rolando was exposed; in front of this

vein could be seen a kind of opaline membrane caused by the fusion of the arachnoid and the pia mater; this covered an old hæmorrhagic accumulation which occupied the substance of the ascending frontal convolution. The walls of this accumulation were carefully excised so as to open into it very freely; the reddish debris which filled it were removed, and the cavity was thoroughly cleansed by irrigations with carbolic acid and corrosive sublimate solutions. The dura mater was carefully fastened again into place by a point of suture, the wound in the scalp was sutured, a single drainage tube being left in. The operation occupied one hour and a quarter. Its after course was very simple. A brief epileptic attack occurred the next day, which caused the operator to take away the drainage tube. By the second day the contracture of the hand had passed away, and power in it had been regained in a large measure. As soon as the patient could rise, it was found that his gait was much improved. His speech was more distinct and his intelligence much greater. These results were permanent. A last epileptiform attack occurred two months after the operation. The report was made six months after the operation.

II. MR. CHEYNE reports a case of a man, æt. 26 years, who had suffered from a chronic suppurative discharge from the left ear for seven or eight years. Came under observation September 11, 1889, with acute symptoms. Twice previously, he had such an attack which lasted each time about two weeks. Both attacks passed off without any special treatment. Four days before admission had some pain in left temporal region and next day two rigors.

On admission the patient complained of dull aching pain in temporal fossa, is perfectly rational, speech is not slow, pupils equal and react, no optic neuritis. Tympanic membrane destroyed and polypi springing from its posterior attachment; hearing much diminished; the painful area in temporal region is also tender to pressure. Temperature 99°, pulse 56. Tongue brown and somewhat dry; lungs, heart and urine normal; bowels constipated; no emaciation.

After admission for four days no new development of note took place. On the evening of the fifth day the temperature went to 101.8°; patient began to moan and became delirious; vomited; slight twitch-

ing of left angle of mouth and left eyebrow; pupils equal and react; face flushed; tongue furred; mouth and lips dry. During next day temperature remained above  $100^{\circ}$  and pulse at 56; patient became more delirious. By the day following, September 16, twitching had become more marked; pulse 52, feeble and irregular, and temperature,  $100.6^{\circ}$ ; and retention of urine. During afternoon became more quiet.

In afternoon had a severe rigor; pulse 50, very feeble, and temperature  $101.2^{\circ}$ .

*Operation.*—Chloroform administered. Now right pupil became contracted, while left remained in a state of medium dilatation. A trephine opening, one inch, was made an inch and a quarter behind the centre of the auditory meatus, and the same distance above the base line. Dura bulged out; no brain pulsation; meningitis. Needle passed inward and forward about half an inch was followed by a spurt of thin, *intensely* fetid pus. Opening in brain enlarged, pus evacuated, cavity curetted, silver drain introduced and external wound closed.

Dressings were changed during night. Next day pulse 82, and temperature reached  $102.2^{\circ}$  in evening. Retention of urine remains, but since operation no further twitchings.

On second day wound looked well, discharge still very fetid, pulse 84, temperature at 9 A. M.  $98.8^{\circ}$ . At 9 P. M. severe rigor, and at 9:20 temperature  $104^{\circ}$ . During day passed urine himself. Very restless and raving.

During the succeeding three days there was a progressive return of consciousness, but each day was marked by a rigor, with temperature varying from  $98.8^{\circ}$  to  $103.4^{\circ}$ . During the fourth day and thereafter, there were no rigors. On the fifth day the temperature became subnormal, pulse 97, very feeble and irregular. Right hemiopia; unconsciousness; more discharge from the ear, but very little from wound.

Sixth day. More drowsy, with increasing unconsciousness; pulse feeble, 80; temperature averaged  $97.8^{\circ}$ . Chloroform administered. Needle passed into brain failed to discover pus; mastoid cells opened but no pus found. No change in condition after operation.

Seventh day. Restless night; lies on right side; unconscious and ir-

ritable when touched. Pupils equal and react to light; no squinting; no facial paralysis. Pulse very feeble and compressible, 84 to 94. Temperature at 6 P. M. 101°; at 9 P.M. 99°.

Eighth day. Very restless; quite unconscious; partial ptosis of left side; no facial paralysis. Since morning has not moved right arm or leg; patellar and plantar reflexes very active on both sides; wound in good condition; temperature, 101.2°; pulse 84 to 96. No loss of sensation.

Eleventh day. Has improved since last note; has moved right arm and leg; ptosis has disappeared; sleeps better; takes nourishment; still unconscious; retention of urine, and not much discharge from the wound, but on moving the drainage tube which went into the brain, several drops of pus escaped. Eyes—left disc looks suspicious, like commencing neuritis; right also somewhat suspicious to the nasal side. Temperature, 97.8°, pulse 80 to 96.

Twelfth day. General improvement; passed urine himself; temperature averaged about normal.

Fourteenth day. Has continued to do well. At the time of dressing drainage tube was found pushed out. A pair of sinus forceps were introduced and when the blades were expanded a couple of drachms of pus came away. Drainage tube inserted.

From this time on the progress was favorable, and on October 25 the drainage tube was left out. On November 18 all wounds had healed, and on the 28th he was discharged; at that time "the patient was quite rational in his conversation, and takes an interest in everything about him. His speech is still somewhat slow, and a moment or two elapses before he replies to a question. His memory is also improving." There is also a good deal of discharge from the ear, and polypi are still present. Discs clearly seen. No present optic neuritis. Some pigmentation around discs at edges.

Mr. CHEYNE, in discussing the case, first raised the question as to whether he should have operated immediately on the patient's admission. He suspected abscess, but hardly thought the diagnosis was clear enough and the symptoms sufficiently severe to warrant trephining without further observation, especially as there was the septic discharge



from the ear. The cause of the rigors is not entirely clear. He first thought they indicated pyæmia, but this was shown not to be the case. There was no evidence of thrombosis of the lateral sinus. The diagnosis was also obscured by œdema of the scalp, due to a dressing of alembroth gauze.

The meaning of the temporary paralysis is also obscure. At first he thought it pointed to purulent lepto-meningitis, but now concludes it was due to a temporary congestion of the cortex in connection with the formation of the secondary collection of pus.

The second collection of pus he considers a new formation, and not a reaccumulation in the old pocket. He recommends the use of sinus forceps in searching for pus in the brain, in place of a hollow needle, as the latter is liable to become blocked by a plug of brain material.

III. The authors report the case of a boy, æt. 14 years, who had suffered for six years with chronic suppurative otitis media. The discharge from the left ear had disappeared eighteen months, and that from the right one week before coming under their care. The symptoms consisted of pain over the whole right side of the head, with other symptoms of intra-cranial irritation and pressure.

As the patient seemed to be in a serious condition, trephining was done just above and posterior to the external auditory meatus, so that the temporo-sphenoidal lobe and the cerebellum might be reached, as there were no distinctly localizing symptoms. After exposure of the dura, which appeared to be perfectly normal, a hollow needle was passed in various directions over the petrous portion of the temporal bone without finding anything abnormal. It was then pushed through the tentorium into the right lobe of the cerebellum, and on withdrawal was found to contain pus and debris. The wound was then closed, and a second opening made below the line of the lateral sinus. Through this the abscess was easily found and emptied of about two drachms of fœtid pus. A drainage tube was then inserted.

Immediately after the operation all symptoms were improved and all progressed well for nineteen hours, when sudden development of Cheyne-Stokes respiration was followed by a rapid failure and death in three hours.

On post-mortem examination the entire brain seemed to be healthy with the exception of the small abscess cavity found in the cerebellum. There could be found no connection between this cavity and the disease of the ear.

In commenting upon the case the authors call attention to the unreliability of the statement that, if the tympanic cavity be the seat of original trouble, the secondary abscess will be in the cerebrum; if in the mastoid cells then in the cerebellum, and if in the internal ear then in the pons. They also think that the accepted frequency of cerebral abscess as compared with cerebellar, of 6 to 1, is too great. The question of the path taken by the infective material in this case they suggest may have been through the small venous and lymphatic channels between the middle ear, the subarachnoid fluid, and the perivascular lymphatic spaces of the cortex.

They also call attention to the need of more careful treatment of suppurative diseases of the ear, especially chronic. In cases where persistent and regular treatment fails they strongly urge that the mastoid cells should be trephined, all caseous matter cleared out and a thorough drainage of the tympanum established.

IV. DR. WILLIAMSON reports a case of a boy, æt. 15 years, struck on the forehead by a rivet six months previous to his coming under his care. This was followed by loss of power in the right leg and arm and the development of fits, which began regularly by a peculiar sensation and twitching of the left side of the mouth. There was no loss of consciousness. He began to suffer from severe and continued headache and a marked sensitiveness of the skin. He became, steadily, more and more dull and stupid. Both eyes were turned to the right, questions were answered slowly and urine passed involuntarily. The left angle of the mouth twitched on the least touch. His general condition becoming critical trephining was done over the face centre. An abscess cavity was found beneath the opening, and cleaned out by spoon. Further exploration by the needle failed to discover pus anywhere else. All symptoms, except the dimness of vision, became somewhat better after the operation and remained so for about one week. His condition then began to grow worse and on the ninth day an exploring needle

was again passed into the brain but discovered no pus. Patient continued to sink and died on the ninth day after operation.

At the autopsy five abscesses were found in the brain; one in the lower part of the ascending frontal convolution (opened); one an inch higher up and a little in front, in the posterior part of the middle frontal convolution, very superficial; another in the supramarginal gyrus, passing downward and forward in the first temporo-sphenoidal convolution and lower part of the ascending parietal; the largest was in the angular gyrus and posterior part of first temporo-sphenoidal and the fifth a mere focus of pus, in the middle of the second frontal convolution. At the point of injury was found a piece of necrosed bone but no pus.

The author remarks that it was a question whether to cut down at the site of the original injury or over the face centre and the motor area but as there were no brain symptoms at the seat of the former and evidently a disturbance about the latter, this point was selected. He quotes Dr. Gowers as saying that he was not aware of any case in which a surgeon was entirely guided by the indications of cerebral localization in finding pus within the cranium and points out the fact that a little closer study of this case would have led him to localize other of the abscesses.

V. *a. Huge cerebral abscess of traumatic origin.*—Boy, æt. 12 years. Nine weeks after a blow upon the forehead presented anæmia and hemiplegic symptoms. Incontinence of urine but not of fæces, double optic neuritis, pupils dilated equal, do not react to light. some ptosis and imperfect movements of left eyeball. Hearing is fairly good on both sides. Tactile sensation present, but blunted. Complete paralysis of right side of body. Right sided convulsions occurred. Cerebral abscess diagnosed and trephining done, one opening made to the outer side of the original wound. Through this opening a needle was passed and located pus in the motor area. A second opening was made over the fissure of Rolando. Through this opening the abscess was found and ten drachms of pus evacuated; a drainage tube was inserted and the parts brought together. Following operation there was a good deal of discharge through the tube; the symptoms were somewhat re-

lieved, the ptosis disappearing and some power returning in the arm and leg. The discharge increased, hernia cerebri formed and after the sixth day the temperature began to go up and the boy died exhausted about three weeks after the operation.

Post mortem examination showed no meningitis. At the base of the brain was some greenish yellow pus. The left hemisphere was found to be a mere shell of brain substance and its lateral ventricle was practically a large abscess cavity. The right brain was healthy except for a little pus in the ventricle.

*b. Brachial monospasm, with Jacksonian epilepsy.*—Male, æt. 39 years, married. The fits begin at the left thumb and index finger and passing up the arm are often, but not always, accompanied by loss of consciousness. Arm during fit was drawn up over head, the fits lasted as long as eight minutes and there were so many as three a day. There was no specific history. There was some loss of power in left hand. The movements during the fits were very rapid and as the disease progressed a lesser convulsion of the right side developed. For a year or so he was kept on large doses of the iodide without any benefit.

As the symptoms pointed to a cerebral lesion, trephining was done a little anterior to the fissure of Rolando. After the button of bone was removed a scalpel was passed in various directions into the brain tissue with a negative result. The wound was then closed and healed by first intention. The patient was relieved for a week but after that the symptoms returned again, as bad as ever, and the patient was finally removed to the insane asylum. After admission to the asylum he continued to have fits, lasting from three to five minutes each, and between them the symptoms varied.

H. B. DELATOUR.

LUCAS CHAMPIONNIERE ON MASSAGE AND MOBILISATION IN  
THE TREATMENT OF FRACTURES.<sup>1</sup>

In a monograph with the above title the author sets forth that which he has previously stated in the *Journal de medecine et de chirurgie pratique*.

The author has used massage in the treatment of fractures for a number of years, and in 1886 in a memoir presented to the *Societe de chirurgie*, he cited 40 cases of fracture of the radius and fibula treated by this method.

The few motions and the slight kneading which M. Bourget used in the treatment of the fractures of the lower end of the radius can not be considered as massage. Only in the fracture of the patella Metzger and Tilanus advised regular massage and early walking, and this according to the writer is wrong, as fracture of the patella is one of the few fractures which should not be treated by massage.

It is well known that a certain amount of deformity does not interfere with the regular functions of the limb, provided the muscles and articulations are intact. But never mind how straight the repaired bone may be, or how slightly apparent the callus, the stiffness of the muscles and joints is the cause of the most marked functional disturbances, and it is to obviate this that the Championniere recommends his method.

The reason that massage has been unsuccessful in the hands of many surgeons is that it has been used too vigorously or too much violence has been used. Mr. Championniere divides massage in four classes:

1. Immediate massage. This is the most perfect way of applying the method. This is used where the chances of secondary displacement are slight, generally fractures around joints. The fractures most suited for this treatment are lower part of radius and fibula, partial fractures

<sup>1</sup>Journal de Medicine et de Chirurgie Practique, December, 1889

of the elbow, head of humerus, and certain fractures of the condyles of the femurs, and the supra-malleolar fractures without tendency to displacement. Here no immobilisation is used. It is only the tendency to displacement which should stop all immediate manœuvres.

2. In the same fractures when the tendency to displacement is marked it is best to massage the limb before placing it in an apparatus this applies particularly to fractures of the wrist, where there is great mobility, and for supra-malleolar fracture.

3. In a certain class of fractures where there is much mobility without much tendency to displacement, such as arm, forearm and leg. The splints are applied, and removed in two or three days, when they are taken down and the parts are masséed, then a daily massage is made followed by replacing the splints.

4. Those cases of fracture where absolute immobility is required for some period of time.

In these cases the motion of the fragments is very great, but rapid mobilisation is a necessity, here absolute immobility of the part for some days, and soon as the callus is sufficient, the apparatus is removed, and massage applied. To this class of cases belongs specially fractures of the upper and lower part of the humerus.

There are three forms of movement employed in the massage of a fracture.

(1) Movements of exploration; (2) movements belonging properly to massage; (3) movements made in the surrounding and even in the affected joints.

1. *Movements of Exploration.*—As soon as a fracture is diagnosed, it is necessary to find out which motions can be gone through by the limb without causing any pain, and of what amount of motion the neighboring articulations are capable without causing pain, and what regions can be pressed or rubbed. During this exploration the limb must be immobilised, and the point of fracture held by the hand. The limb during this investigation may be placed on a sand-bag. The author severely condemns that which he calls the barbarous practice of looking for crepitation.

2. *Massage Proper.*—The seat of fracture having been ascertained.

which is a capital point, for it must not be subjected to direct pressure, and the limb having been fixed, and the point of fracture immobilised, the massage is begun. Pressure is made with the hand, and is perpendicular to the axis of the limb. With this pressure is combined a sliding of the hand along the limb. This sliding of the hand must always be in the direction of the axis of the limb, and following the direction of the venous return. The pressure and gliding of the hand must always be in one direction, never up and then down. Besides these two movements, a third is often used, it consists of circular pressure, a sort of grinding rotary movement exercised with the palm of the hand. This is to be used wherever there is much tumefaction, and any localized exudation.

The part of the hand most used in massage of fractures is the thumb, after that, when more force is required the palm of the hand.

Pétrissage of the muscles should not be performed as it is too rough and painful.

Massage must not cause pain, it must relieve it. The manœuvres must be progressive; the first must be extremely gentle.

The length of a seance is at least fifteen minutes. It is important that the skin of the operator, and of the one operated on, should be extremely soft, and supple, the best substance to use to facilitate the motion is perfectly pure oil.

*Movements to be made by the fractured limb, and by the neighboring parts.*—When the seance of massage has been ended, all the small joints of the neighborhood must be worked, as well as the large articulations, these motions should cause no pain or displacement of the fragments.

The movements are two fold, active and passive, but should not be too extensive. The massage should not be practised oftener than once in twenty-four hours, and after the first week it is not necessary to apply massage daily, every two or three days will suffice. The first seance of massage should take place as soon as possible after the fracture has occurred. Except in those cases where there is much tendency to displacement no splint should be applied after the massage. Dr. Lucas Championniere absolutely condemns the use of an elastic bandage after

a fracture, as has been advised by Oberst of Halle, Vide ANNALS OF SURGERY, December, 1888. When there is no tendency to displacement a simple flannel bandage is a sufficient dressing.

**ACTION OF MASSAGE.**—The first result is to cause a disappearance of the pain, then, by favoring absorption, it causes the tension due to extravasation to disappear. Moreover, the blood-clots, which act as irritants, are displaced, broken up and more easily absorbed. The swelling, under massage, disappears with great rapidity. Also under massage the slight muscular ruptures heal readily. The only contra-indication to massage lies in the extreme mobility of the fragments. If, although there is great mobility of the fragments, they can be temporarily immobilized, massage should be practiced, but if the mobility of the fragments renders a permanent deformity liable, massage should be abandoned.

#### SPECIAL FRACTURES.

*Fracture of the Radius at Its Lower Extremity* is the fracture the best suited to massage. If the deformity is very marked and shows much tendency to return, after the first seance of massage a splint should be applied for five or eight days, and then the treatment begun anew; otherwise a daily massage, and no splint need be applied afterwards. Massage in these cases should be applied to the wrist joint, to the fingers and to the muscles as far as the elbow joint, care being taken to avoid the point of fracture. This same treatment is applicable to fracture of any part of the bone.

*Fracture of the Fibula.*—The only contra-indication to the massage treatment here is not the lateral mobility of the fragments, but the tendency to eversion of the foot, and this is easily remedied. The fractures around the malleoli give the best result. Ordinarily after three weeks the patient is cured.

*Fractures of Both Malleoli* give excellent results with this form of treatment, as there is much pain and considerable swelling, both of which subside readily under the above described form of treatment. If there be much tendency to displacement, the leg should be immediately masséed, then put up in an immovable dressing for eight or ten



days, and afterwards taken down and masséed daily and replaced in the splint. In these cases the massage should be carried on as high as the thigh.

*Fractures of the Head of the Tibia.*—In these the same course should be pursued, only the seance must be more prolonged.

*Fractures of Both Bones of the Forearm* are to be treated by what Lucas-Championniere calls the mixed method, that is, massage, immobility in a splint for eight or ten days, when it is left off and massage again used.

*Fractures of the Elbow.*—Where there is no deformity no apparatus should be used. Most cases are those in children where there is fracture of the humerus which simulates a backward dislocation; here the tendency of a return of the deformity is so great that an immovable apparatus should be applied after the first seance and left on from 15 to 20 days.

*Fracture of the Olecranon.*—In these cases, like in fracture of the patella, the writer advocates cutting down and suturing the bone, and later on, massage.

*Fracture of the Upper End of the Humerus.*—Fracture of anatomical neck without displacement must be masséed immediately and the seance will have to be prolonged; the pain, which is marked, will persist for some time; the whole of the shoulder should be included in the treatment.

Fracture of surgical neck with displacement of the lower fragment should be brought in proper place, and mixed method used if there is much mobility or tendency to the return of the deformity. The seance in these cases must be very long. If necessary, administer chloroform for the first sitting, and do the massage while the patient is anæsthetized.

*Fracture of the Neck of the Femur.*—Massage; patient to get out of bed as soon as possible; care taken during the massage not to exert much pressure in the inguinal region or Scarpa's space.

*Fracture of Shaft of Femur.*—Massage and the use of Hennequin's splint, or massage combined with extension.

*Fracture of the Patella.*—Same treatment advocated as for that of

olecranon; suture, then massage; massage alone in this fracture gives bad results.

For the past five years the author has treated all the cases of fracture, both in hospitals and private practice, by the method above outlined, and claims only good results. He employed massage in the treatment of fractures of the lower extremity of the radius some fifteen years ago, and claims the priority for this form of treatment.

F. C. HUSON.

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#### JAFFÉ ON THE THERAPY OF HABITUAL SCOLIOSIS.

In a recent number of *Volkmann's Sammlung klinischer Vorträge*, Dr. Max Jaffé, of Posen, discusses the myopathic theory of scoliosis, and the therapy based thereon.

He does not think that the curvature is produced by antagonism in muscular action (the muscles on the concave side of the curve being contracted, while those on the other side are in a condition of extension.) He states that the position in which, according to myopathists, the muscles contract in order to maintain their posture, are not those in which we are accustomed to employ muscular action, they are positions of rest, maintained without any muscular contraction.

Differences in muscular development on both sides are never observed in commencing scoliosis, and the results of autopsies on which myopathists base their theories only exist in chronic cases with extreme deformity.

The therapeutics based on the myopathic theory, unilateral massage and exercise, are of no service whatsoever, and are not comparable to the symmetrical development of the entire muscles of the back. Whatever successes have been obtained by myopaths depend on the fact that it is impossible to act upon special muscular groups without acting on others as well.

Therefore it should be endeavored to secure a uniform and symmetrical development of the spinal muscles. This treatment satisfies the physician that in scoliosis badly developed and atrophied muscles are present in all portions of the back, and of the correctness of Meyer &

Volkmann's theory that scoliosis depends on a gravitation deformity.

It is a well-known fact that in order to maintain an upright posture constant muscular action is necessary; this is shown by the fact that a person becomes tired after a longer or shorter time. If he desires to continue standing he assumes one of the numerous positions of rest in which no muscular force is exerted. A common position of the kind is to place the right foot somewhat to the side, shifting the weight to the right side, and bending the neck and trunk towards that side. The left knee is somewhat bent, consequently the left side of the pelvis is lowered and the right elevated. This produces a corresponding curve of the spine toward the left side. All this is done without muscular action and simply by the pressure of the joint surfaces, the motion being limited by ligaments.

There are any number of such positions of rest both in standing and sitting and if they are frequently assumed by growing individuals of weak muscular development, they finally become habitual.

The fixation of the deformity is due to the fact that the parts situated on the convex side of the curve, which are relieved from pressure, undergo development, while those on the opposite side become more or less atrophied. The factors which cause fixation of the deformity are potent usually only during the period of growth, because the bones and cartilages are soft and will more readily assume an abnormal form which is necessary to the perpetuation of lateral curvature.

An abnormal weakness of the bones and other tissues is probably also responsible for the causation of the deformity. Otherwise there is probably no specific affection of the tissues in chronic scoliosis.

Dr. Jaffe believes that quite a number of static scolioses become habitual, and this will become more apparent if surgeons take the trouble to examine cases of inequality of the lower limbs for deviation of the spine.

The reasons why static scoliosis does not become habitual are: (1). That static cases do not as a rule take place at a time of life which is favorable for that change. (2). That the muscular weakness which is present in the habitual form is not always present in the static. (3). That static scoliosis is only observed during sitting or standing and

disappears at other times. There is also another factor which acts to prevent the development of habitual scoliosis.

Static scoliosis is due to the fact that one extremity is shorter and also weaker than the other, the convexity of the curve being toward the shortened limb, but in standing or walking the weight of the body is transferred to the side of the longer leg and this produces a compensating curve with the convexity towards the sound side.

Heredity is also possibly a factor in the production of scoliosis, the deformity being transmitted from parent to child.

It is necessary to determine whether the scoliosis is fixed or static; this has been done by extension of the body but is regarded by Jaffe as unreliable, for the spinal processes may show no deviation although the vertebral bodies have undergone rotation. It is better in cases of supposed habitual or fixed scoliosis to look for torsion of the vertebræ and if this is present in the slightest degree the diagnosis of fixation is confirmed.

The best means of diagnosing torsion is by placing the patient flat on his abdomen with his arms extended along the head. In good light the inspection will reveal the least inequalities on both sides.

The writer believes that cases where redressment is possible should not be classed as scoliosis for in many of these cases the lateral curvature is only the expression of tired and weak muscles, and is found absent at the next examination. This stage is rather a predisposition to than an actual condition of the trouble.

Some cases of permanent deviation with slight fixation are sometimes rectified by depressing the pelvis, either by raising the foot by a thicker sole, or by an oblique seat in sitting.

An important indication for treatment is the strengthening of the muscles of the back. No special muscles are to be treated, but the entire muscular layer of the back.

Gymnastic exercises particularly fulfill this indication. The child is placed flat on the abdomen, with arms extended forward and is made to bend the head and upper part of the trunk backward. At first this exercise is performed with difficulty, but as the muscles become strengthened it requires less and less exertion. It is to be practiced

several times a day, in short sittings and the clothing need not be removed.

Massage is an excellent means of strengthening the muscles and is to be employed twice daily.

Faradism is useful but less so than massage. In cases of slight scoliosis massage is directly curative. Cold sponge baths and douches should be employed as adjuncts.

Corsets and similar apparatuses are of slight value.

The above described treatment is very effective in commencing scoliosis, and if properly carried out prevents fixation of the spine.

These same measures are equally useful in the later stages of scoliosis in conjunction with measures directed to the removal of the fixation.

To overcome the deformity it is usually recommended to place the patient in a position by which the existing lateral curvature is compensated, or at least converted into the opposite. If, however, there are several curves any portion which will rectify one will increase the other. To counteract this disadvantage it is recommended to raise or lower the pelvis in dorsal curvature for example, but these means are insufficient.

Even in cases of single curvature this method is valueless, since a compensatory curvature usually develops and may even be induced by measures used to overcome the existing deformity.

The writer's method of redressement is as follows: The patient is placed on the abdomen and before beginning the manoeuvres the operator maps out the position of the rotated and permanent vertebræ, and also the points of greatest prominence. At these points the assistant presses in the prominent parts forcibly and the vertebræ connected with them towards the median line or even beyond it. The first part of the manoeuvre rectifies the rotation and the succeed compensates or over compensates for the lateral deviation. If there are two convexities the other hand of the assistant redresses the second deformity, and if there are more than two curvatures a second assistant is required. Pressure should never be made upon one convexity without counter pressure upon the other prominences. The great advantage

being that the rectification of one deformity does not augment another as all curvatures are attacked simultaneously. It has been proposed to carry out these manœuvres by machinery but the hand is more exact and accurate. This form of redressement should be practiced once or twice daily by trained assistants, the spine being carefully inspected before commencing the manipulations.

The good effects of this treatment are observable after the child has been treated a short time, by a greater symmetry of the lateral contours of the trunk. The effect is not momentary but remains for a short time. No greater force than that of the hand should be used.

For exceptional cases of markedly fixed scoliosis the author employs lateral suspension according to the method of Lorenz. The patient is placed on the side on a firm, well upholstered bar and rests upon the greatest prominence. In this way the head and neck fall to one side, and the lower extremities to the other. The body must be placed in such a position that the force works in the same manner as in the above described form of redressement by the hand. The body is to be placed midway between the dorsal and the lateral position, and the less the body is supported at the sides the greater is the force acting on the deformity.

This method though very effective is inferior to the first, inasmuch as several prominences can not be acted upon at the same time.

The ideal method for the treatment of scoliosis would be an apparatus which secures permanent redressement. The objection to this is that any amount of pressure sufficient to correct the deformity can not be borne continuously.

The author is firmly persuaded that we must give up all idea of efficient permanent redressement in fixed scoliosis. This applies also to Sayre's plaster jacket. The action of a plaster dressing on the extremities can in no respect be compared with its action on the thorax, which is constantly changing its form during respiration. The corset may to a certain extent compensate for the mobile portion of the deviation, but this ought to be accomplished by strengthening the muscles, besides this, the corset prevents exercise of the muscles, and after it is laid aside the deformity soon returns owing to muscular weakness.

Extension produced by the plaster jacket produces a diminution of the antero-posterior curve of the spine and this directly favors the progressive development of scoliosis, and has no effect in the correction of the rotation.

The author has often observed in children treated with the corset an increase in the fixation. If the corset is to be used it should be a removable one and worn for several hours only during the day. The corset is of advantage in certain cases in which the scoliosis is accompanied by a diminution of the normal kyphosis of the spine, *i. e.*, cases of kypho-scoliosis. In these cases there is no danger of an excessive correction of the antero posterior curve, but these cases are rare, and even in them, the corset is only to be regarded as a support and only to be employed in combination with the above described measures.

F. C. HUSOX.

## INDEX OF SURGICAL PROGRESS.

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### GENERAL SURGERY.

**I. The Animal Suture.** By Dr. H. O. MARCY (Boston). The most interesting chapter in the history of animal ligatures describes their use and widespread adoption in the ligation of arteries for many years in America.

Jamieson, of Baltimore, in 1827, wrote: "Physick and Cooper, by employing a ligature having the property of dissolubility, greatly improved our practice. Physick's ligature, first used in 1814, have done much good. Cooper, in tying, in 1817, the femoral artery of a man, æt. 80 years, and the healing of the wound by the fourth day, shows the superiority of this method over that of Scarpa." Physick and Dorsey cut their ligatures from chamois leather, and rolled them on a smooth surface to make them hard and round. McDowell tied the pedicle in his ovariectomy cases with buckskin ligatures and closed the wound. This was also the practice of Nathan Smith, in 1829, John Bellinger, in 1835, and others.

The state of the artery, the processes of change going on in the blood, the so called inflammatory processes, etc., occupied the attention of the surgeons of that period rather than the consideration of the material of the ligature, although the eminent men referred to emphasized the importance of a material which was removed by the absorbents rather than eliminated as a foreign body.

Dr. Marcy points out the value of these early and interesting studies upon a subject of the first importance, and emphasizes the originality and honor as due to American surgery.

The author, after reviewing briefly the well known studies of Mr. Lister and the new era in surgery thereby inaugurated, gives brief reference to his first use, in 1871, of buried animal sutures, aseptically



applied to retain the abdominal contents, after an unusually large opening, made to reduce a strangulated hernia. The repair was rapid and cure permanent. This led Dr. Marcy to a series of histological studies made upon animals to ascertain what became of the sutures left aseptically buried in the different structures of the body. He determined that there ensued a proliferation of connective tissue cells about the suture which, with a greater or less rapidity, dependent upon condition of suture and of the surrounding parts, invaded the structure, and, little by little, it was not only absorbed, but in large measure was replaced by a band of living tissue. He first published his observations in 1871, and again in 1878, presented a further contribution upon the subject.

Believing his demonstrations were correct and dependent thereon, the importance of the material used, as well as the manner of application to the tissues, Dr. Marcy entered upon a systematic study of animal suture. He regards catgut as defective; first, in its primary preparation, fermented until the mucous coat of the intestine becomes a putrefying mass, in order to separate the thin connective sheath from the mucous and muscular coats; it is consequently liable to be infective. Second, the connective tissue fibrils are diagonally disposed in a very thin layer. Thirdly, the necessary twisting, and often sand-papering for finish, damages the structure as material for suturing. The parallel disposition of the cells and fibrils in tendons greatly increases their strength and resistance to change in the tissues, and consequently they are better fitted for sutures. They are easily obtainable from a number of animals, are preserved non-infected by simple drying, and when soaked can be separated as fine as desired. The history of the tendon sutures is given in detail, and from the results arrived at by Dr. Marcy he has a decided preference for the tendons obtained from the tail of the kangaroo. The Indian tendon suture, the fascia lata of the moose, dried and smoked with the tribes of the Northwest, an article of commerce and easily obtainable, furnishes excellent material for sutures.

Dr. Marcy reports his experiences with the buried animal sutures applied to all variety of wounds. He recommends their use only by

strict disciplinarians of aseptic surgery under this rigid rule: "An aseptic suture, aseptically applied, in an aseptic wound."

He claims that an aseptic wound should be entirely closed by buried animal sutures, the stitches taken from side to side, lightly through the deeper layer of the skin, and covered by iodoform collodion as a germ-proof dressing.

Drainage in all non-infected operative wounds is not only unnecessary but detrimental, and should not be used.

He clearly shows that he was the first, not only to use aseptically buried animal sutures, but that he published his experiments five years before Werth in Germany, to whom the credit in Europe has been generally given.—*Med. Record*, March 8, 1890.

#### NERVOUS AND VASCULAR SYSTEMS.

**I. Traumatic Fistula of the Spinal Cord. Cure.** By Dr. VORSTER (Berlin). The above interesting case occurred in the service of Prof. Rose. The patient, a strongly built locksmith, was stabbed in a brawl. The knife entered to the left of the spinal column, 2 cm. from the spinous process of the second dorsal vertebra, and passed between the laminae of the first and second dorsal spines. The length of the wound was 5 cm. There was immediate motor and sensory paralysis of both extremities; the anaesthesia extended in front upward as far as the nipple; behind as far as the scapula. The left side was more profoundly affected, there being also analgesia on this side: passive movements possible in both extremities, but attended with great pain in the right leg. There was pain in the back upon movement. Liquor cerebro-spinalis at first did not escape, but subsequently this occurred to such a marked degree as to saturate the dressings and necessitate their removal. The wound was not sutured, but after thorough disinfection covered with antiseptic dressings. The patient made a most complete recovery, being finally enabled to walk about without the aid of crutches. The spinal wound healed after a tedious and protracted illness of the patient, the details of which are given in the original article, the whole picture being that of paraplegia of the lower extremities, followed by symptoms of Brown-Sequard's

spinal paralysis, lasting for 10 months. There was at first a severe hæmorrhage from the wound, and the author advises against suture of such wounds of the spinal cord, and points out the possible cure of such cases by continuous dorsal position of the patient in bed.—*Deutsch. Zeitschrift. f. Chir.*, Bd. 29, heft 5 and 6.

HENRY KOPLIK (New York).

**II. Nerve-Suturing in the Axilla.** By DR. E. ETZOLD (Dorpat). Six cases are communicated from the Dorpat clinic of wound of the large nerve trunks in the axilla, treated by suture. All the cases occurred in students while engaged in dueling with swords, and all were upon the right side. The vessels were first carefully ligatured and suture of the divided nerves followed. The material used for the suturing was sublimated silk. One was treated by means of the direct suture; the balance by the para-neurotic suture. The healing processes pursued an uninterrupted course in 3 cases; in the others but slight disturbances occurred. The final result, however, was in the highest degree an unsatisfactory one. The traumatic paralysis, particularly that of the hand, after periods varying from five months to six years, were found to be but very slightly improved. In the only case in which decided improvement occurred, it was found at the time of the operation that the median nerve was alone injured, and that a bridge of connective tissue remained between the stumps of the divided nerve. The paralysis was limited from the beginning, and final restoration of physiological function took place. The next best result occurred in a case in which all the motor nerves were involved in the injury. In this latter case, up to four months following the injury no improvement could be noted, but after six months, signs of returning function were discovered which was succeeded, after nine months, by quite well marked restoration of function of the triceps, and commencing ability to move the forearm. The study of these cases shows, as far as can be demonstrated by clinical observation, that the regeneration of the nerve fibres commences at the central end and progresses in a direction toward the periphery. This is in accord with the experience of other surgeons.

This series of cases of division of the axillary nerves is of interest from the rarity of the accident. The position assumed by the duelist in thrust and parry particularly favors wounds in this locality. The literature of the subject is quite meagre, however, the only case of nerve suture in the axilla being that of Baudens (1836), which ended fatally.

The return of sensibility is not infrequently a misleading symptom in the diagnosis of a regeneration of the nerve. The latter occurs by proliferation, and as above stated, always from the proximal stump. The evidences afforded of this regeneration include, 1st, active muscular contraction; 2d, disappearance of muscular atrophy; 3d, the slow appearance of this improvement; 4th, the return of response to the Faradic current in muscles known to be previously paralyzed. — *Deutsche Zeitschrift f. Chirg.*, bd. xxix, p. 430.

**III. Enucleation of Varices of the Lower Extremity.**  
By DR. BÖNNECKEN. Prior to the operation, the extremity is allowed to depend from the operating table, and an elastic bandage is loosely placed in the upper third of the thigh, in such a manner as to somewhat restrain the venous, and without interfering with the arterial circulation. The veins to be excised are divided longitudinally and loosened subcutaneously upon both sides. The formation of pediculated flaps are to be avoided on account of the danger of sloughing. The most centrally located portion of the diseased vein, generally the saphenous vein, is to be ligatured in two places, and the vein loosened from its attachments in a direction toward the periphery; lateral branches are to be secured by forceps. The elastic bandage is now loosened, the incisions in the skin closed with a cutaneous suture and small drains arranged to drain the pockets through counter openings. The limb is suspended for twenty-four hours, and the dressings changed in from 8 to 10 days. The results obtained are both satisfactory and permanent. — *Berlin klin. Wochenschrift*, 1889, No. 8.

GEORGE R. FOWLER (Brooklyn).

## HEAD AND NECK.

**I. Transplantation of Rabbit's Conjunctiva to the Human Eye.** By J. R. WOLFE, M.D., (Glasgow). The author briefly discusses the operation of transplanting the conjunctiva of the rabbit to the human orbit in cases of symblepharon from traumatic causes. He operates as follows: (1) He first separates the adhesions by means of blunt-pointed scissors, so that the eyeball can move in every direction. The conjunctival sac and cornea are cleared of nodules. (2) Two rabbits are then put under chloroform, one being kept in reserve in case of accident. (3) He takes from the rabbit that portion of the conjunctiva which lines the inner angle, covering the "membrana nictitans," and extending as far as the cornea on account of its vascularity and looseness. If the palpebral opening is too narrow, he enlarges it at the external angle and introduces a ligature through the whole thickness of the free border of the lower lid, and by means of this ligature the lid is drawn open and kept steady and the conjunctival cul-de-sac exposed. (4) Into the middle of the flap to be removed, a black silk ligature is introduced, a knot is tied and the ligature cut short. The knot is intended to mark the epithelial surface of the membrane, for without it the flap is apt to curl up and leave us at a loss how to adjust it. (5) Next he makes the boundary of the conjunctiva of the rabbit which he wishes to transplant by inserting four black silk sutures, which he secures with a knot. The ligatures having been put on the stretch, he separates the conjunctiva to be removed with scissors, and by means of a fine spatula spreads it upon the back of his left hand. The four ligatures are then cut off and the conjunctiva trimmed to the requisite size. It should be larger than the lost substance. (6) He now returns to the patient and sees that the bleeding has subsided and that the parts are in a fit condition to receive the transplanted flap, which has, in the meantime, become very like a piece of parchment, and adherent to the dorsum of the hand. (7) It is then lifted by means of a spatula and transferred to replace the lost conjunctiva of the patient. It is secured in its place by six or eight sutures, or even more if necessary. This is a very difficult process, re-

quiring delicate manipulation, and the assistant must keep the flap in its place by a spatula while it is being stitched in its new place. Both eyelids are closed with lint and a bandage and kept so for four days. The sutures are left in for six or eight days.

Owing to the tediousness of the operation it is impracticable to use chloroform, and this is generally dispensed with in cases of adults. Young subjects are anæsthetized during the first stages and kept under control thereafter by moral suasion. A number of cases are quoted. —*London Lancet*, Dec. 14, 1889.

JAMES E. PILCHER (U. S. Army).

**II. Total Resection of the Bones of the Face.** By DR. PÉAN (Paris). The case is one of extreme interest, as it is one of multiple, recurrent osteofibromata occurring in a young woman, æt. 23 years, and due to dental heterotopia.

The following bones were removed for the cure of the disease: Upper and lower maxilla, part of the sphenoid and both malars.

The origin of the disease dates back nine years; in 1884 the right maxilla was removed for this disease, *i. e.*, osteofibroma, but there was a recurrence followed by the spread of the trouble into the same bone of the left side of face. The woman was first seen by Péan in November, 1888. At that time, both superior maxillæ much enlarged, specially the left, which was about the size of the head of a new born child. The lower jaw was much swollen and enlarged. The eyes and nose were much sunken in, and the orbital, nasal and buccal cavities were almost completely closed. The gums were much thickened, and the teeth loosened and deviated, though nothing in their arrangement led to suppose two of them to be ectopic. Mastication, deglutition, phonation and vision were much interfered with.

In order to remove the whole of the trouble, it was necessary to remove the three maxillæ, the malars and part of the sphenoid.

On December 14, 1888, Péan proceeded to remove the tumor from the upper part of the face, that is, resecting both maxillæ, and the pterygoid processes of the sphenoid; here on following up the tumor he found a small molar tooth lodged in the spongy tissue of the body.

of the sphenoid. Presumably this dental heterotopia was the cause of the trouble.

Six weeks later the lower jaw was removed by an incision running along its lower border from one angle to the other. The jaw, on account of its size, was removed piecemeal. On removing the symphysis, at its lower border, a canine tooth of the second dentition was found laying transversely in the bone.

The patient recovered rapidly from the effects of the operation, and at present, 14 months since the operation, there is no return of the disease.

A prothetic apparatus was devised by Prof. Michaels, of the school of dentistry, and by this means the patient is enabled to eat comfortably.—*Bull. de l'Acad. de Med.*, No. 2, 1890.

**III. The Obviation of Cicatricial Contraction of the Jaw by the Transplantation of a Skin Flap.** By DR. BROHL. (Cologne). The unsuccessful treatment of cicatricial contraction of the jaw by division of the cicatrix and gradual dilatation of the contraction, as well as the poor results obtained by making an artificial articulation according to the plan of Esmarch and Rizzoli, had proven that the replacing of the cicatricial tissue by normal skin was the only method capable of producing a permanent cure.

Thiersch's method of skin-grafting cannot be used in these cases, and only flaps nourished by pedicles can be utilized. Excellent results were obtained by Gussenbauer (*Langenbeck's Archives*, Vol. 21-23), who replaced the mucous membrane by skin flaps taken from the cheek, and covering the defect thus produced by other flaps taken from the neck or chin, and doing, at the same time, a cheiloplasty of the already deviated mouth. This method is excellent, but has two faults; first, a difficult plastic at the angle of the mouth; second, the formation of extensive scars on the face.

Bardenheuer succeeded in overcoming all these objections, as will be seen by the following case: A girl, æt. 21 years, was treated, in 1888, by injections of gray oil for syphilitic ulcerations of the vulva. In the beginning of 1889, she was attacked by a marked and rapidly

spreading stomatitis ulcerosa, which, notwithstanding vigorous treatment, brought on extensive necrosis of the lower jaw, and a marked cicatricial contraction of the mucous membrane of the right cheek. On April 8, 1889, she was admitted to the hospital, and owing to extensive cicatricial bands between the gums and cheek of the upper and lower jaw on the right side, she could hardly open the mouth over 2 mm. Four teeth had been removed for caries, but the others were sound and the stomatitis was perfectly cured.

On April 20, Bardenheuer, by means of an incision 8 cm. long, parallel to the border of the lower jaw, removed the cicatricial bands, so that the mouth could be opened completely by a speculum. At the same operation he marked out a double pedicled flap, one bridge of which was on the right clavicle, while the other was in the direction of the ramus of the jaw and about 2 cm. from it. The wound along the border of the jaw was packed with gauze. On May 8, the flap was dissected away from the underlying tissue, and its lower bridge gradually cut away. This was completed May 15, when the flap was twisted on its upper pedicle and the granulations scraped off, when the flap was passed through the wound along the border of the jaw, drawn into the mouth and fixed in position by silk sutures which went entirely through the flap and cheek. The wound in the mouth had been freshened. The defect in the clavicular region was freshened and sewed. On June 4, the pedicle of the flap was cut through and sewn in the wound of the jaw, and the loss of the substance on the neck was covered by skin grafts according to Thiersch's method.

The wound along the angle of the jaw was completely healed July 26. During the whole course of the treatment much stress was put on the frequent clearing of the mouth, and its frequent opening and dilatation by a Heister's speculum. Seven months after the operation the patient can open her mouth perfectly and separate the teeth over 2 cm. The only scar on the face is along the border of the jaw and is not adherent to the bone.

The patient can now be regarded as completely cured — *Deutsche Med. Woch.*, No. 8, 1890.



**IV. The Treatment of Large Defects of the Mucous Membrane of the Cheek.** By PROF. M. OBERST (Halle). Loss of substance of the mucous membrane of the cheeks from whatever cause, is always accompanied by the danger that the subsequent cicatricial contraction will prevent free motion of the lower jaw, and opening the mouth. Where large pieces of the mucous membrane have been removed, the subsequent contraction has been so great that absolute immobility of the jaw followed, and the teeth were dislocated by the continuous pressure.

If a strong cicatricial contraction follows the extirpation of a carcinoma of the mucous membrane of the cheek, the patients are in a worse condition than previously.

If an operation for the removal of carcinoma of the cheek has to be done, care must be taken to avoid the subsequent cicatricial contraction by some form of plastic operation.

In two cases Oberst did a plastic at the same time that he removed the carcinoma, using a part of the mucous membrane of the upper and lower lips to cover in the defects, and only leaving a very small portion of the wound to granulate.

Both patients did extremely well.

Oberst advises the employment of this method where little or no skin has been removed, if much of the latter has had to be sacrificed, he advises the transplantation of skin flaps with the epidermal layer turned inward, according to the various meloplastic operations devised by Gussenbauer, J. Israel, Hahn and others.

The mucous membrane of the cheek and lips is exceedingly well adapted for plastic purposes, as it is extremely elastic and vascular.

If this should not succeed, grafts taken from animal or human mucous membrane may be tried.—*Deutsch Med. Woch.* No. 5, 1890.

F. C. HUSON (New York).

## ABDOMEN.

**I. A Contribution to the Surgery of the Liver.** By Dr. JAMES ISRAEL (Berlin). A patient, æt. 34 years, suffered at the age of 5, from a freely movable abdominal tumor about the size of two fists.

At the age of 7, after an attack of fever this tumor opened in the rectum; and at present the scar is yet to be felt, just above and to right of the prostate. Most probably this tumor was an echinococcus cyst of the mesentery. After passing for a long time numerous vesicles per anum, the patient remained healthy till 1887 when icterus, swelling of the liver and a feeling of abdominal pressure set in. In December, 1888 there was marked enlargement of the liver and pronounced icterus. The liver was enlarged in the direction toward the free border of the ribs in the mamillary line by 11 cm and the ensiform cartilage by as much. The organ was scarcely enlarged upwards. The right lobe felt hard, irregular, hobnailed, and its free border presented many indentations, in short, it felt markedly cirrhotic.

A long needle introduced immediately under the free border of the right ribs and diverted upward and backward allowed echinococcus fluid to escape. Therefore the cyst must have been situated on the convexity of the liver, and shut in by the diaphragm. It could be operated on by one of two methods, either by the author's method of resecting a rib and cutting through the costal pleura and diaphragm, thus coming upon the sac, or by Landau's proceeding, that is dividing the abdominal wall and drawing down the liver in strong anteversion, so that the lower border of the sac comes into view. This latter method was chosen as the more rapid.

After opening the abdomen by a transverse incision immediately under the border of the right ribs, the liver could not be drawn downward and anteverted, for the organ was firmly adherent to the abdominal wall by band like adhesions, some of which were very short and strong, and they could not be divided without seriously damaging the hepatic structure. The part of the liver exposed by the incision was found to be the seat of an extremely marked cirrhosis over the anterior surface of the organ, exactly in the middle of the abdominal incision, there ran, from above downward an enormously dilated vein, about the size of the femoral artery. It being found impossible to draw down and tilt the liver, it was attempted to sew the non-adherent part to the wound, but this was found to be impossible owing to the extreme brittleness of the tissue. The wound had to be tamponed with iodoform

gauze. Seven days later, after adhesion had been formed, it was decided to cut through the thick hepatic stratum intervening between the cyst and the incision by means of the thermo cautery. This stratum was 7 cm. thick at its thinnest point. The division of the tissues was guided by a needle introduced into the cyst. The operation went on without difficulty for the distance of about 1 cm., when suddenly a profuse hæmorrhage set in from the above described vein. This hæmorrhage was so severe as to necessitate compression of several minutes' duration. Just as the bleeding had been checked, and the tampons removed, an exceedingly alarming accident occurred. Suddenly intense dyspnoea set in, respirations reached 60 per minute, and all respiratory muscles worked to their utmost, deep cyanosis spread all over the body, the chest wall was shaken by an extremely strong heart's action, but in marked contra-distinction to this, the radial pulse was small; almost imperceptible. The sound over the aortic valves was weaker and weaker, while there was a marked sharp second pulmonary tone the respirations soon became irregular and sighing. The patient was almost moribund. Continual artificial respiration was kept up and about 50 dry cups were applied to the chest as rapidly as possible; numerous camphor-ether injections were made. In the course of an hour the respirations sank from 60 to 28 and the cyanosis almost completely disappeared. Auscultation of the lungs revealed on both sides sharp vesicular breathing and here and there a few crepitant râles. No bad symptoms followed this accident, which was probably due to entrance of air in the wounded vein, and air embolism in the course of the pulmonary artery.

Seven days later the operation was again undertaken, the tissue divided by a Pacquelin cautery and the sac reached. Soon as its contents were evacuated, a large quantity of bile escaped. That the bile did not come from the divided parenchyma was shown by its continuing to escape after the wound had been tamponed by hard rubber chemise canula. The only explanation for the flow of bile is that ulcerated bile ducts communicated directly with the echinococcus sac, and had remained closed owing to the pressure of the contents upon these ducts and that once the pressure removed, the canals could directly empty themselves in the sac.

As a rule the flow of bile soon ceases, but in this case it kept up continuously for over 16 months, and about 1 litre a day escaped; nevertheless the patient gained 5 to 6 pounds in weight. For the first six months after the operation hardly any of the bile escaped into the intestines. The cause, in this case, was an extensive calcareous degeneration of the cyst wall, which prevented its complete contraction and closure and hence the subsequent contraction of the gall ducts, and also the extremely cirrhotic condition of the liver prevented the bile from following unobstructedly in its normal direction. Attempts were made to dissolve these calcareous plates by injections of strong lactic acid, and even fuming nitric acid, but this was without avail; the best means was breaking them down piece-meal and removing them with dressing forceps. The cavity contracted somewhat after this but bile still escaped.

This fistula was afterwards closed by a well fitting drainage tube provided with a stop-cock, and from the moment this was done the external flow was completely controlled, and no dilatation of the cyst took place.

Later on it was attempted to close the fistula by making it heal by granulation, this was only partially accomplished. Frequent injections of tincture iodine were used for this purpose.

For the last ten weeks the tube has been removed completely and no bile escapes from the fistula.—*Deutsche. Med. Woch.*, No. 3, 1890.

F. C. HUSON (New York).

#### GENITO-URINARY ORGANS.

**I. Nephro-Lithotomy.** By Dr. E. L. KEYES (New York). The author reports six cases in which the kidney was exposed and explored by the lumbar incision for supposed stone. In one case an abscess without stone was discovered; in another case no stone or other lesion was found after very thorough exploration. All recovered promptly from the operation. His conclusions, based on his experience, are:

1. The posterior exploratory incision upon a kidney suspected to contain stone is devoid of any serious danger when performed with

proper care, and should be resorted to more often than is at this date sanctioned by general surgical opinion.

2. The best incision is the transverse, below the twelfth rib, with as much of a liberating incision downward along the line of the edge of the quadratus as may be required to gain ample room.

3. The kidney may be freely cut into and rudely lacerated with the finger, when the stone calls for it, without producing any hæmorrhage which hot irrigation will not control.

4. It is better, in the case of a large branching calculus, to break it up and extract it in fragments, rather than to attempt to remove it entire.

5. So little danger attaches to the posterior incision that it seems wiser always to make it the first step, reserving peritoneal exploration for a later resource in cases where the posterior exploration miscarries. —*Med. Record*, February 8, 1890.

**II. Extirpation of Tuberculous Seminal Vesicles** By Dr. EMERICH ULLMANN (Vienna). In 1829, Dalmar described a chronic inflammation of the seminal vesicles, the description of which corresponds closely to that of tuberculosis. Since then the affection has been described by Albers, Jaye, Naumann, Humphrey and Kocher, and lately it has been studied by Rayer, Cruveilhier and Reclus, as secondary to tuberculosis of the lungs.

As a secondary affection, this trouble is not only seen in connection with tuberculosis of the lungs, but is more common after primary tuberculosis of the epidydimis, either as a continuation of the cheesy degeneration in the vas deferens, or spreading by contiguity of tissue from the sides of the prostate.

Primary tuberculosis of these organs is extremely rare, and still less often diagnosed, and up to the present time no surgical interference has been attempted.

Ullmann gives the history of a case where he removed the seminal vesicles. It is as follows:

Boy, æt. 17 years, entered the clinic with right sided tubercular testicle; the seminal vesicles on that side were much enlarged. Left side

normal, lungs apparently healthy, sexual functions not yet developed, no erections, no emissions.

On July 17, 1889, unilateral castration on right side.

July 27. Extirpation of right seminal vesicles by a semilunar incision of the perineum, midway between scrotum and anus, the base of the incision being directed toward the sacrum; a careful dissection of the tissues was made and the prostate reached. The rectum was dissected away from this organ, and the posterior wall of the bladder made to protrude slightly by means of a sound introduced through the urethra, so that the vasa deferentia and the seminal vesicles could be distinctly seen. The right seminal vesicle was much enlarged, and its upper part cheesy, its lower part much infiltrated, as well as the vas deferens on that side. The left vesicle was enlarged and hardened. These parts were carefully dissected away and the left vas deferens left in place. In the right upper corner of the prostate a small abscess was found, and this part of the gland was removed. The hæmorrhage being checked, a drainage tube was introduced in the wound, which was then closed by sutures. That evening a severe secondary hæmorrhage took place, which required reopening of the wound, and its packing with iodoform gauze. Some urine escaped through the wound, showing that the bladder had been opened. The patient recovered from the effects of this operation in a very short time, and gained flesh and strength. The wound closed perfectly, except for a small fistula, and all the urine is voided through the urethra. Lately he says he has had two erections. Microscopical examination of the removed part showed plenty of tubercle bacilli. Dr. Ullmann recommends this operation in the following cases:

1. In primary tuberculosis of the testicle or epididymis, when no suspicious symptoms have appeared on the sound side, and when on the affected side the vesiculæ seminales are already attacked. (Should both vesicles be diseased and one vas deferens healthy, the latter should be left undisturbed, but the vesicles removed.)

2. In cases of primary tuberculosis of the seminal vesicles.

The impotence following the operation should be no contra-indication, for in all reported cases of tuberculosis of the seminal vesicles,

impotence always occurs in a short time; in fact it is regarded as a cardinal symptom of the disease.—*Centralbl. f. Chir.*, No. 8, 1890.

F. C. HUSSON (New York).

## WOUNDS, INJURIES, ACCIDENTS.

**1. Accidents Following the Sojourn of Projectiles in the Tissues.** By Prof. J. CHAUVEL (Paris). In a paper read before the Academy of Medicine of Paris in October, 1887, M. Chauvel held that in those regions of the body where perfect asepsis was difficult or impossible, the general rule now admitted of non-intervention after the lodgement of projectiles should not be observed. Lately he has had to operate on three cases in which the projectile imbedded in the tissues gave rise to very serious symptoms. His cases were:

1. Gunshot wound of right thigh; extraction four months later of the projectile (a piece of iron), which kept up a profuse suppuration, and interfered with the movements of the limb; perfect cure followed the removal of the foreign body.

2. Bullet wound of left knee-joint in 1870, followed by ankylosis at right angles; track of bullet never completely closed, persisting fistulæ, osteitis. Amputation of thigh for relief of symptoms done in 1889. Bullet found lodged in internal condyle.

3. Bullet wound of left hip in 1884, persisting fistulæ and neuralgic pains ever since injury; extraction of a sequestrum from the ilium. The bullet still remains in the pelvis, and the patient is only improved. The doctor, after carefully describing and analyzing the above cases, comes to the following conclusions:

1. Tolerance of bullets is not as common as is generally believed, and is the exception rather than the rule.

2. That immediate extraction of the projectile must not be abandoned, provided the operation is easy and not too dangerous.

3. The accidents following the lodgment of a bullet in the tissues vary according to the nature of the tissues and the seat of the projectile, and often, instead of improving with time, they grow worse.

4. When this is the case surgical intervention is necessary, and the

projectile must be sought for and removed.—*Gaz. Hebdomadaire de Med. et de Chir.*, No. 3, 1890.

F. C. HUSSON (New York).

**II. Injury to the Penis During Coition.** By DR. ALEXANDR A. NEVSKY (Gorokhovetz, Russia). A healthy and strong gentleman, æt. 25 years, while performing coitus with his wife, suddenly felt an intense acute ("as if cutting") pain about the penis. On immediately withdrawing the organ, he discovered a profusely bleeding laceration. On examining the highly excited patient about half an hour later (during which time the gentleman had lost about half-a-cupful of blood in spite of a continuous application of cold, pressure, etc.) the author found a widely gaping, irregular, deep, lacerated wound with everted and tumefied edges, measuring in length more than an inch, and running transversely along the posterior or lower aspect of the member about 1 inch from the edge of the foreskin. The latter proved to be unusually elongated and tight, its orifice very narrow, so that the glands could be exposed only to a very slight extent. The wound was at once washed out with a 2% boracic acid lotion and closed with silk sutures, after which the hæmorrhage ceased. In 5 or 6 days, the lesion healed *per primam*. As to the mechanism of the injury, Dr. Nevsky suggests that during the sexual act the patient's long and phymotic prepuce formed a terminal fold looking upward; which led to an extreme stretching of the skin on the lower surface of the organ, the tissues giving way at the point of a maximal distension under some violent pressure of the glans. Pointing out that traumatic injuries to the penis during coitus represent a very rare occurrence, the author says that he has been able to find only two instances of the kind in recent international literature, both being communicated by American practitioners. They are Dr. Veazie's case of a complete fracture of the penis (*New Orleans Medical Journal*, 1884) and Dr. Egerton Davis' (Philadelphia) of strangulation of the member in the vagina (*Deutsche Medicinische Zeitung*, 1885, August 6.) [In the *Lancet*, February 18, 1888, p. 321, Dr. Hulke, of London, relates a very interesting case of sprained penis with a consecutive, long-continued priapism



caused by inflammation of the lacerated left crus. The patient, an artisan, æt. 34 years, was heavily intoxicated during the intercourse with his wife.—*Reporter*—*Vratch*, No. 48, 1889, p. 1058.

**III. Rupture of the Perineum and Recto-Vaginal Septum During First Coition.** By DR. ROMAN L. SINAISKY (Slutzk, Russia). A previously quite healthy, newly married, young Hebrew woman, æt. 23 years, of middling size and make, applied to the author on account of pain on walking and defecation, which symptom had appeared after her first marital intercourse two days previously. She added that the coition had given rise to an excruciating local pain and profuse bleeding, causing her to faint. The examination showed that the woman's external genitals were developed quite normally, and that the hymen (of a semi-lunar variety and a moderate thickness) was intact. On separation of the major labia, the posterior commissure proved to be lacerated, the wound forming a funnel-shaped cavity admitting freely 2 or 3 fingers and communicating with the rectum just above the anal sphincter; the vagina contained fæcal gases and matter. There was also present a total rupture of the perineum running along the raphe, but involving only the skin and subcutaneous cellular tissues. An operative treatment was proposed but declined by the patient. Dr. Sinaisky discusses at length the question concerning the etiology of the severe lesions found in his patient. He does not entertain any doubt whatever that they were actually contracted during the coition. The patient's husband proved to be a robust young man, æt. 23 years, possessing a large-sized member, but no knowledge concerning marital business (at least he stated that he had never yet had intercourse with women before the present occasion). Since the couple most emphatically declared that neither of them had introduced finger or any foreign body into the woman's genital tract, and since all their statements generally seemed to be altogether trustworthy, the author arrives at the conclusion that the lesions were inflicted solely by some violent and wrongly directed pressure of the inexperienced young man's powerful and stiffly erect penis against the base of the hymen, the woman, possibly, lying in some inappropriate posture. The vio-

lence might be intensified in virtue of the attempt at coition being undertaken with retracted prepuce (Masalitinoff, Harris, Boriakovsky) the young man being a circumscribed Hebrew.

Reviewing the literature of the subject, the author points to the following instances of similarly severe injuries to female genitals during coitus: 1. Albert's case ("Hoffman's Handbook of Forensic Medicine") referring to an Arabian girl, æt. 11 years, in whom the first intercourse with her husband, a robust lad of 16, caused the rupture of the posterior commissure, navicular fossa and vaginal fornix, the latter communicating with the abdominal cavity. 2. Toulmouche's (*ibid*) of rupture of the perineum in a ravished girl, æt. 25 years. 3. Zeiss's (*Centralblatt fuer Gynæcologie*, No. 8, 1886) of laceration of the vaginal roof during coition performed in an elbow-knee posture about six weeks after a forceps labor. 4. Chadwick's (*Boston Med. and Surg. Jour.*, April 30, 1885) of rupture of the vagina in a sterile woman æt. 48 years. 5. A. G. Masalitinoff's (*London Medical Record*, May, 1886, p. 214) case of rupture of the perineum in a weak chlorotic Hebrew woman æt. 24, the lesion taking place during the first coitus with her athletic husband who performed the act in a drunken state.. 6. Masalitinoff's case (*ibid*) of vesico-vaginal fistula occurring in a Georgian woman æt. 18 years, during her first coition with her husband. 7. Afanasy N. Boiakovsky's (*Vratch*, Nos. 46 and 47, 1886, p. 821) case of rupture of the perineum and vulvo-rectal fistula in a peasant woman, æt. 17 years, who had undersized external genitals, abnormally short genital slit (the distance between the urethral orifice and posterior commissure being not more than 2 cm.), a deep depression (*cul de sac*) on the posterior periphery of the vestibule, a narrow pelvic arch (the angle being only 62° against the standard 90°-100°), and a subnormal inclination of the pelvis (40° against the standard 60°). The patient's husband was a robust peasant, of 24 years, with a large sized penis and a retracted foreskin. The first coition was exceedingly painful. On the next morning fecal gases, and on the third day fecal matter began to escape from the woman's genitals. The fistula was successfully closed by Prof. G. E. Rein about 3 years later. Dr. Linoisky's collection may be supplemented by the following cases. W. A. Esipoff's case (*Lon-*

*don Medical Record*, May, 1886, p. 214) of rupture of the urethra occurring during the first coition in a young woman, æt. 19 years, with imperforate hymen and 2,000 cub. cm. blood pent up in the vagina and womb. 2. J. Price's (*The American Obstetric Gazette* May, 1886) of vulvo-rectal fistula arising during the first coitus in a woman, æt. 22 years. 3. Duguer's (*Vratch*, No. 47, p. 843, 1886), of rupture of the perineum and vagina during the first intercourse with the husband possessing a big penis and performing the act in a very rough and violent manner. 4. Blumenthal's (quoted by Price, *l. c.*) of vulvo rectal fistula, operated by Spencer Wells in 1860. 5 and 6. Diemberbroeck's cases (*Anatomia Corporis Humani*, quoted by Boriakovsky, *l. c.*) of rupture of the vagina referring to two newly married young Dutch women, both of whom died from acute anæmia caused by hæmorrhage. 7. Liman's case ("Hoffman's Handbook") of rupture of the perineum. —*Russkaia Meditzina*, No. 46, p. 711, 1889.

VALERIUS IDELSON (Berne).

## BONES, JOINTS, ORTHOPÆDIC.

**I. On the Results of the Non-Operative Treatment of Fracture of the Patella.** By DR. W. T. BULL (New York). The author presents the results obtained by him in the treatment of sixteen cases of primary fracture of the patella, and six cases of refracture. His treatment had consisted in the use of plaster-of-Paris bandages after the effusion had subsided, with the application within the splint of adhesive plaster strips to steady the fragments. After six and eight weeks this splint was removed, a posterior splint applied, and the patient allowed to walk. For the next month or six weeks the posterior splint is always worn by day, the thigh and knee are vigorously shampooed and kneaded, but care is taken not to flex the joint and thereby stretch the ligament. At the end of three months, the patient is usually able to bend the limb but slightly, but the power of extension is good. Occasionally the splint is worn for a fourth month. Gradual increase of the use of the limb without further support is encouraged from this time. Passive motion is undesirable.

As regards the functions of the limb, Bull reports the result to have

been functionally perfect in ten cases; that is to say, the flexion and extension of the limb has been complete and strong, and the ligament firm, with little or no atrophy of the thigh. In four other cases flexion and extension has been imperfect, but the joint has subserved all the needs of the patient. In the two remaining cases there resulted no power of extension whatever, and the patients were compelled to wear supports or walk with a cane.

As regards the character of the union in the fourteen perfect and fairly good cases, it was believed to be bony in one instance; in two there was no appreciable separation of the fragments; in the remaining cases it varied from one-fourth inch to one and one-fourth inch, the average being nine-tenths of an inch. In the two bad cases, the ligament was one fourth of an inch in one case, and one and a half inch in the other. In the six cases of refracture, in two excellent functional power was regained, one with a ligament of one inch and the other with one of an inch and a half in length. The four remaining cases of refracture remained deficient in power of extension with ligaments from one and a half to five inches in length.

The author emphasizes the need of stimulating the development of the quadriceps. He advises that in case the ligament and joint functions begin to weaken after the sixth month, wiring of the fragments should be done, but condemns without exception wiring in recent fractures, and challenges those surgeons who resort to the immediate suture to explain by what process of reasoning they can call it a justifiable procedure.

In cases of refracture and of old ununited fracture the author gives a qualified assent to the propriety of the wire suture although suppurative arthritis and abscesses in the thigh, terminating in death, had followed in the only case in which he had attempted to apply the suture for the cure of ununited fracture. In compound fractures wiring is proper. Death, however, resulted in the only case of this kind recorded by the author.—*Medical Record*, March 22, 1890.

**II. Final Results in Resection of the Knee-Joint.** By DR. NEUGEBAUER (Strassburg). The author has carefully tabulated

101 cases of resection of the knee-joint occurring in the clinic of Prof. Lücke. The so-called "typical" resection has, according to the author, not been carried out in this clinic for some years past. By following the more modern nomenclature he has endeavored to conform to methods adopted in certain recent articles upon this subject. Typical resections in this article include those cases in which cartilage or sections of bone have been removed from both articular extremities of the bones of the joints. Partial resections include those in which either the capsule of the joint has been removed or simple curettement resorted to. The incisions were made according to various methods. In most cases the joint was drained. At first the typical Lister dressing was used but afterward iodoform gauze and sterilized muslin were used in combination. Some cases received the sugar dressing.

The after-treatment consisted in allowing the patient to be about as soon as ankylosis was complete. The joint at this time being supported by a plaster or glass dressing. Chronic gonitis, 90 cases; acute gonitis, 6 cases, and ankylosis, 5 cases, were the diseases for which resection was resorted to. There were 42 males, 29 females treated and the resections (partial) were equally divided among them. The cases occurred mostly in the youthful but a hereditary history could be obtained in only 76% of cases. The results in total resections were complete cure, 60%; incomplete cure, 18%; secondary amputation, 7%; incomplete cure, 18%; secondary amputation, 13%. A complete cure signifies in the above firm ankylosis without fistulæ. Sepsis, 1; tetanus, 2; tubercular meningitis, 1; erysipelas, 1, were causes of death. In reconsideration of the above cases deducting deaths and return of unfavorable cases, the author makes out a good result in 85% of cases operated upon by both methods of partial and complete resection. Of 61 cases there resulted angular deformity in 32, 52% of total and 52% partial resection. This is not favorable to the partial method considered in the total number of cases. Lengthening was observed in only 3 cases after operation. Shortening was observed on discharge of patients in only 4 cases. In only one case could it be established that shortening was absent years after operation. The ages of 1 to 10 years were favorable to the least amount of

shortening; this, though true for partial resection; is not the case in total resections, where we find the shortening greater at these years, and the partial resections were only favorable operative cases in younger individuals.—*Deutsche Zeitsch. f. Chirg.*, bd. 29, hft. 4.

HENRY KOPLIK (New York).

**III. Excision of Both Hip Joints for Acute Disease.** By W. H. BATTLE, F.R.C.S. (London). A delicate boy, æt. 14 years, eight weeks previously suddenly began to experience pain in the left hip which was soon followed by pain and swelling in the right hip. There was a tuberculous family history. The patient was in an exceedingly debilitated condition with numerous bed sores and high fever. There was much swelling about the right hip, chiefly over the front of the joint, but on this side fluctuation was not well marked and disease did not appear to have invaded the gluteal region. The thigh was flexed but not so much as on the left side, the right knee crossing the upper part of the left leg, the thigh being slightly abducted. The left hip presented a large globular fluctuating swelling, which extended around the great trochanter and upward and backward into the buttock. The patient received general systemic treatment for three days when, on account of his high temperature, excessive pain and the collection of pus it was decided to operate. Under ether, an incision was made four inches long in a direction from below upward toward the posterior superior spine, with the limb at an angle of  $45^{\circ}$  with the trunk, commencing about an inch below the top of the great trochanter and crossing its middle, the cut giving exit to several ounces of thick pus. The bones were exposed but none of the granulation growth usual in tubercular diseases could be found. The head of the femur could not be brought to the acetabulum, so the neck was divided with a saw and the head removed; after this, the sawn surface of the neck could not be made to descend lower than the upper margin of the acetabulum. The wound was dressed antiseptically.

Three days later, the pain and swelling in the right hip increasing, Parker's incision from the front was made giving exit to a large quantity of pus. The finger in the joint showed the presence of a loose piece

of bone which proved to be the separated disc-like epiphysis of the head of the femur, and was removed with necrosis forceps. This wound was dressed and closed antiseptically.

Extension was made by a double hip splint and tonics given. The progress to recovery was interrupted only by a short attack of cutaneous erysipelas eight months later and an excellent result was obtained, the patient walking well without apparatus and presenting a shortening of an inch in the left limb.—*London Lancet*, Oct. 12, 1889.

**IV. Dislocation on to the Dorsum Ilii in a Child.** By W. B. COSENS (Taunton and Somerset Hospital). A boy, æt. 7 years, fell while running a "three legged race" with a companion. On examination by Mr. Farrant, the left thigh was found to be semi-flexed, adducted and rotated inward, the ball of the great toe almost resting on the dorsum of the right foot; the great trochanter was above Nelaton's line. Extension of the limb was attended with great pain. The luxation was easily reduced by flexing the thigh on the abdomen, rotating outward and quickly bringing the leg down to a straight line with the body, the head of the femur entering the acetabulum with an audible click. This lesion is rare in children, but fifteen coming under this category out of a collection of eighty-four made by Hamilton.—*London Lancet*, October 12, 1889.

**V. Dislocation of the Hip in Children.** By J. K. DOUGLAS, M. B. (Scone, N. B.), and C. L. DIXSON, M.R.C.S. (Slantwit Major, S. Wales). Douglas' case occurred in a boy, æt.  $7\frac{1}{2}$  years, who, while running along the road with another boy on his shoulders, was pushed down, his left leg doubling up under him. On re-examination the usual signs of iliac dislocation of the head of the femur were found. Under chloroform the bone was readily returned by flexion, inward rotation and extension.

Dixson's occurred in a girl, æt. 6 years, who had fallen out of a cart, with her right leg bent under her. An iliac dislocation having been discovered, the dislocation was reduced by placing the operator's left foot on the right ilium and making extension of the right leg by pulling

the limb at right angles to the body.—*London Lancet*, November 2 and 9, 1889.

JAMES E. PILCHER (U. S. Army).

**VI. The So-Called Periostitis Albuminosa.** By Dr. JOHANNES VÖLLERT (Halle). Riedinger, a short time ago, described under the name of "ganglion periostate" an affection already well known to surgeons, and which Ollier calls periostitis albuminosa.

By the efforts of Ollier, and especially those of Riedinger, an entirely unfounded etiological significance or stamp has been given to this affection. In fact, the causes of Ollier's periostitis albuminosa or Riedinger's periosteal ganglion are entirely different from those of ordinary ganglion, and thus various names can only cause confusion.

The cases described under the name of periostitis albuminosa (or exudativa or serosa) are, according to the experience of Prof. Volkmann, cases of suppuration from the beginning, either in the form of cold muscular or intra-muscular abscesses, or even begin as an original disease of the bone or periosteum.

In not a few cases of ganglion the cause may not be referred to an irritation of the joint, even though the bulging of the capsule, which through obliteration of the pedicle is converted into a blind cyst, shows at the beginning hardly any connection with the joint. The contents of these cysts are a thickened, colloid synovia. Their origin is doubtless mechanical, though it can not always be traced.

Volkmann has never seen well marked inflammations of a joint lead to the formation of a ganglion, with the exception of a few fibrinous knee joint inflammations accompanied by the formation of popliteal cysts containing rice-like bodies. But these belong to the group of hygromata.

Most of the cases of cold, mucoid or synovially degenerated abscesses observed by Volkmann were previous to the discovery of the influence of bacteria on suppuration, so that they cannot help to settle the questions of any special micro-organism causing this degeneration.

Under the name of lymph abscesses, old surgeons understood cold abscesses with a very slow course and without any inflammatory symp-



toms. They are soft, early fluctuating tumors, not movable and not well limited. Later on the skin over them may become inflamed, thinned, and ulcerated, even fistulous, so that the fluid contents will escape and a long continued secretion will be kept up. Incision will show a reddened, thickened and softened lining membrane similar to that of an abscess, showing that this is the result of an extremely torpid and atonic inflammatory process. These cold abscesses generally lie immediately under the skin or under a fascia. They grow slowly so that they only reach a certain size in from three to six months, and often remain unchanged for years, and may even retrogress and grow anew.

If these abscesses remain a long time near a bone the latter becomes affected (Chelius and Bardeleben). The name of lymph tumors was first applied to them by Binl, but they have nothing to do with lymph extravasations. Generally the contents of these lymph abscesses have more resemblance to sero pus. It is a turbid, grayish-white stringy fluid, containing white blood cells, fatty detritus, broken-down cells and tissue elements mostly in a stage of regressive metamorphosis. The chemical reaction is similar to that of pus. These abscesses, according to Volkmann, also contain a fluid which differs greatly from ordinary pus but closely resembles the fluid of tendinous sheaths and synovial pouches. The local causation by injury or contusion can only be looked on as accidental.

So far no cause has been found for the development of these lymph abscesses. Recklinghausen says that their genesis is yet undetermined, so that their reference to a hæmor or a lymphorrhagie, as well as to the lymphatic system in general, cannot be determined for the present.

Most cases, it is true, are met with in scrofulous, tuberculous or run-down persons, though they are also seen in apparently healthy persons.

The best treatment consists in laying these abscesses freely open and treating them antiseptically.

It is well known that mucoid degeneration takes place often in other parts of the body, and moreover, not leucocytes alone, but other cells

can undergo this degeneration, that is epithelial fat and connective tissue cells, as well as the connective tissue itself and finally the fibrin.

That which has been described by Ollier as periostitis aluminosa, by Riedinger as ganglion periosteale; is in most of the cases nothing more than a sub-periosteal or periosteal abscess the contents of which have undergone mucoid degeneration. Such abscesses may come on spontaneously, and then continue causing a slight hyperostosis of the bone, or can be produced by a primary disease of the bone itself or what is still rarer, may be due to local tuberculosis, or to a chronic osteo-mylitis.

Many authors have tried to give a fitting pathological name to this condition and much confusion has been the result.

Lannelongue is of the opinion that these are abscesses in which there has been a metamorphosis of the pus. Many writers, Poncet, Toccorian, Catuffe and Schlange are of the opinion that in the so-called periostitis aluminosa there has been an inflammation of the bone or periosteum, or both, which has not gone beyond the serous stage, and owing to a want of intensity of the inflammatory irritation pus has not been produced, but only an exudation rich in albumen. Poulet and Bosquet believe the trouble to be tuberculous. Schlange is opposed to this as he has found no bacilli in his cases. Volkmann does not consider the process tuberculous, but considers it as a cold abscess. Bacteriological examination of the removed fluid has been negative. Staphylococci have been found only once. No tubercle bacilli or any specific bacterium of any sort has ever been found.—Volkmann's *Samml klin. Vorträge* No. 352.

F. C. HUSSON (New York).

#### GYNÆCOLOGICAL.

**I. Frost-Bite of External Genitals in a Parturient Woman.** By DR. ALEXEI P. TEPLASHIN (Glasov, Northeastern Russia). The author narrated the following interesting case. A young unmarried peasant woman, æt. 18 years, primipara, living at a village  $\frac{3}{4}$  mile from the Glasov Zemsky Hospital, had left her home for the latter shortly after the rupture of the foetal membranes, which

had happened about 10 P.M., on January 5, a bitterly cold day (the temperature being below— $30^{\circ}$  Reaumur =  $-35.50^{\circ}$ F.). She had gone afoot all the distance, but used to “rest”—that is, to sit down deep in snow—on every labor pain, notwithstanding her being clad but very poorly and having no drawers (according to the custom of Russian women belonging to the working classes). About 4 hours after her admission she was safely delivered of a live and strong boy. On the next morning she began to complain of pain about her perineum and buttocks. On examination, the whole perineum and the lower parts of the buttocks and major labia were found to be severely frost bitten and covered with numerous bladders. About evening, the temperature rose up to  $39^{\circ}$  C., to oscillate at a high level for the following three weeks, during which period the patient was also suffering from severe diarrhoea. In course of time, the integument of the injured region sloughed away, the separation of dead tissues as well as cicatrization and healing proceeding but slowly. On the 34th day, the woman was discharged with restored perineal and gluteal integuments, but with the lower parts of the labia replaced by contracted scars.—*Russkaia Meditzina*, No. 34, 1889, p. 523.

VALERIUS IDEISON (Berne).

## II. On the Treatment of Malignant Ovarian Tumors.

By H. W. FREUND (Strassburg). A contra-indication for the performance of laparotomy in malignant ovarian tumors is the finding of metastasis in other organs. As soon as the operator knows with certainty that all the neoplasms cannot be removed he should not operate.

Freund communicates in this work the experience of the Strassburg clinic, which speaks in favor of a broadening of the indications.

Nearly all operators now agree that in cases where malignant ovarian tumors are confined to the ovaries, laparotomy should be performed. We are by no means always able to diagnose with certainty the malignity before the operation, and only recognize later by anatomical examination the peculiarities of the growth.

Here Freund communicates fitting examples which justify the extirpation of such malignant tumors. Eight other cases are mentioned

where, on account of extensive metastases, only a trial incision with cleansing of the perineum was made. The procedure is easily borne, and it may produce a better state of health for quite a long time (over a year). Where there is any prospect of relieving at all, trial incision should still be made, even if a diagnosis of cancer has been made with certainty.

Twelve cases observed in the last few years of extensive malignant ovarian tumors, are of especial interest. In some cases of extirpation of malignant tumors, there were found embedded in the perineum of the floor of the pelvis (Douglas' pouch, the vesico-uterine excavation, etc.), single neoplastic nodes; these were removed manually, which took place without hæmorrhage, yet, in spite of this, in such cases complete recovery could be confirmed even after a lapse of two years.

Also in cases of numerous similar metastases removed by laparotomy, as well as in cases where metastases were removed from the omentum, abdominal wall, etc., the very favorable influence of the operation could be seen.

Even in cases of extensive metastases where not all of the neoplasm could be removed, the strikingly favorable effect could not but be seen. Such women would remain for months free from the former troubles (ascites, œdema of the thighs, etc.)

In ten of the cases there was hydrothorax which mostly disappeared quickly after the operation.

Freund separates those single or multiple tumors situated in the deepest part of the peritoneal cavity from the extensive metastases in the organs of the peritoneal cavity. He is of the opinion that here one has to do with particles of the primary tumor which have broken off and fallen down. These tumors were connected to the peritoneum by means of firm tissue, so that only the upper and crumbling part, and on the base, could be operatively removed, they were removed by enucleation without any hæmorrhage. They acted like implanted foreign bodies. The favorable clinical experience in a few cases speaks in favor of this explanation. Hence Freund proposes that secondary tumors in the ante- and intrauterine space should not contraindicate the

radical operation. Also in some cases with an extensive cancerous growth Freund speaks for laparotomy. By removing the secondary phenomena, ascites, hydrothorax, œdema, etc., the pernicious influence of the original neoplasm, even if it be not removed from the body, is paralyzed for a certain length of time. Hence, in such cases one should not perform puncture, but the ascites should be removed by incision and the abdominal space dried out as much as possible.—*Ftschr. f. Geburts. und Gynækol.* Bd. xxvii.

ALBERT PICK (Boston).

**III. Four Cases of Pyo-Salpinx.** By DR. VÖHTZ (Aarhus). In the first case, where the pus-sac communicated with the rectum, extirpation could not be performed on account of too extensive adhesions; in the second and third cases the adnexa of both sides were removed; in the fourth case only those of the left side were removed and in this case there developed a fluctuating tumor on the other side, in the course of two to three weeks after the operation; this was opened through the vagina and much pus evacuated. As the pus cavity was lined by a soft mucous membrane-like membrane the writer regards it as a rapidly developing pyo-salpinx of the other side. The operation in all cases was difficult; none of the patients died. In at least three of the cases he could trace them back to a gonorrhœic infection. Among the symptoms he mentions repeated pains running down toward the hips and thighs, making their appearance spasmodically, becoming sometimes very violent, not infrequently made worse upon walking, thus leading one to think of hip-joint inflammation. He also mentions that recently he has observed very grave pulmonary affections after laparotomies, where he did not use artificial illumination, but in chloroform narcosis where it was used he has seen bad results follow and perhaps one death—*Hospitals Tidende*, 1889, 22, 612-619.

A. PICK (Boston)

**IV. An Ovariectomy in a Seventy-Six Year Old Woman.** By DR. JOSEPHSON (Stockholm). The writer performed an ovariectomy on a woman, æt. 76 years. She had borne seven children, the last one

forty years before. Nine years ago she remarked a tumor in the right side of the abdomen, movable and of the size of a hen's egg. It increased in size until it filled the entire abdominal cavity and since three years it had been very painful. There was slight nephritis; simple ovariectomy; no adhesions; uneventful recovery.

**V. Ileus After Ovariectomy.** By DR. SALIN (Stockholm). The tubo ovarian cyst was easily removed; there were no adhesions; the temperature was normal after the operation. Apparently the patient got along well until the third day after the operation when meteorism appeared, which increased the following day with vomiting and flatus in spite of all endeavors. Laparotomy in the night between the fourth and fifth day after the operation; a convolution of the small intestines was adherent to the pedicle and thus a kink with closure of the passage arose. The adhesion was separated and the gas pressed out, yet the condition of the patient did not improve, no flatus was passed and she died the following day (fifth day after the operation.—*Hygiea*, bd. 1, 1889, No. 12.

F. H. PRITCHARD (Boston).

ON PENETRATING GUNSHOT WOUNDS OF THE  
ABDOMEN. AN EXPERIMENTAL STUDY  
AND CLINICAL REVIEW.

By AUG. SCHACHNER, M.D.,

OF LOUISVILLE.

NOW that the propriety of operative interference in the treatment of penetrating gunshot wounds of the abdomen is fairly settled, a natural demand addresses itself to the surgeon for the early establishment of such rules as offer the best success in the treatment of these injuries.

While the indications upon a whole may seem very plain, there are yet many questions and processes to be understood and decided, which time, research and experimentation can alone supply. An analysis of such cases and discussions as the current literature affords bears strong evidence in this direction, and until a more intimate knowledge of the details of the subject is at hand, our success must necessarily be limited. In view of this, a series of experimental operations were instituted by Dr. Ap Morgan Vance, and the author, with the hope of throwing additional light upon the subject, and although the desired end may not be found within the scope of this paper, it is hoped that it may be of some value as an additional contribution to that already at hand from Parkes, Senn, Bull, Stimson and others. Before entrance upon the subject proper, we take this occasion to extend our thanks to the hospital committee, Dr. J. L. Long, Mr. B. H. Lammers, now Dr. Lammers, and others, for valuable assistance rendered upon different occasions. The earlier and major portion of this work was done near the suburbs of the city, but upon the approach of winter was transferred to the Louisville City Hospital. The facilities afforded at either place were only ordinary, and especially at the latter, where several dogs that had been

operated upon and recovered, as well as one that was shot, and upon which no operation was performed, through a defective means of keeping, made their escape. The dogs were selected, regardless of their surroundings or conditions, and in several instances their deaths were apparently traceable to the undersize of the subject.

Shaving the field of operation and anæsthetizing constituted the only preliminary steps to which they were submitted previous to the shooting. In nearly every instance ether was the anæsthetic employed, five deaths occurring from the effects of the anæsthetic which are not hereafter mentioned in the experiments. Of these, with the exception of one or two, chloroform was employed, death occurring either before or during the earlier part of the operation. The shots were fired at a close range, and only such care exercised as to avoid the production of some irreparable injury, while they should still fairly present such cases as ordinarily fall into the hands of the surgeon.

The wounds were inflicted by a .22 and .32 calibre Smith & Wesson pistol and a .22 calibre Remington rifle, the projectiles used being floberts, .22 "shorts" and "longs" and .32. Comparing in size the abdominal viscera of an average full-grown dog with those of an adult human, about the same effect is obtained from the use of a .22 in a dog as that of a .32 or larger in a man.

The work was done as antiseptically as permissible. After shaving, the field was scrubbed with potash soap, followed by a 1:2000 sublimate solution, or a 5% solution of carbolic acid, and lastly bathed in a 10% ethereal solution of iodoform. During the progress of the operation the surrounding site was covered with towels, wrung out of a hot 1:2000 sublimate solution. Likewise upon the part of the operator suitable antiseptic precautions were employed. Successive baths of permanganate of potash, oxalic acid and hyposulphite of soda served for the preparation of the sponges. In those cases where cleansing of the abdominal cavity was indicated, flushing with warm Thiersch's solution or warm sterilized water was resorted to; otherwise the irrigator charged with Thiersch's solution answered the purpose. Catgut prepared



after the method of Kocher, and silk after that of Czerny, represented the materials used for sutures.

The dressings in common use did not prove to be of practical value here. After closure of the abdominal wound, which was done by the combined "mattress suture" and "glover's stitch," it was dusted with iodoform and a liberal application of liq. gutta percha used as the only dressing. The liq. gutta percha when made by reinforcing the U. S. P. preparation, with an additional one-third of its official amount of gutta percha furnished an admirable dressing, sealing the wound in a most thorough manner. As to the food, this in the beginning, for about a week subsequent to the operation, was restricted to that of a liquid character, but later such care was less and less observed, until finally almost ignored, and in one instance where a resection was done, by a mistake a large piece of raw meat was given but a few hours after the operation without any evil resulting. Such briefly represents the manner in which the experiments were carried on. Neither time nor space would permit here of even a brief review of the opinions and progress of the work done upon this subject.

#### SOME GENERAL CONSIDERATIONS OF THE NATURE OF THESE INJURIES.

Nowhere within the domain of surgery are the effects attending gunshot wounds more multiple and uncertain in their nature than those penetrating the abdominal cavity.

Even where some definite knowledge of the character of weapon and missile used and the circumstances under which the injuries were received are at hand, no safe conclusions can be reached as to the extent and course of the ball or the amount and character of damage it creates, since it is a well-known fact that even where projectiles are discharged under conditions as like as practicable, they will often differ widely in their energy and velocity. While it may be safely said that as a rule the extent of danger is more or less in direct ratio to the size of the ball, such a rule is by no means absolute. Numerous conditions, some of which apparently trivial in their

nature, have a marked influence upon the effect of the missiles. To a certain extent this was discernable in these experiments where floberts, .22 "shorts" and "longs" were differently employed. Notwithstanding the latter and regardless of the weapon, there was apparently no difference in the number of perforations whether the one or the other was employed. Such however was not the case as regards the nature of the injury. Here a certain relation was traceable between the character of the missile and weapon upon one hand and that of the injury upon the other. Especially was such the case



FIG. 1.—SHOWING A PERFORATION CREATED BY A .22 CALIBRE BALL FIRED FROM A REMINGTON RIFLE.

where the rifle was employed, the effect of which was in nearly every perforation markedly out of proportion to the size of the ball. Figs. 1 and 2, each of which measured more than an inch in length and nearly the same in width. The diverse effects of missiles are generally explained upon the differences in their energy and velocity, together with a rotatory motion which they acquire after a certain part of their course. Where the disproportion between the effect and the size of the missile is

very great the difference seems to point largely to the latter as the cause. With the exception of two, every ball fairly entered the abdominal cavity and many passed through making their exit upon the opposite side. Of the two that failed to enter one became arrested immediately under the parietal peritoneum while the other fell harmlessly aside without even producing a lesion in the skin.



FIG 2.—SHOWING ANOTHER PERFORATION CREATED BY A .22 CALIBRE BALL FIRED FROM A REMINGTON RIFLE.

In forty experiments upon thirty-six alive and four just dead from the effects of the anæsthetic, where it was positively known that the ball had entered the abdominal cavity, one escaped without receiving any injury whatever to the contained viscera, in another the damage amounted to a non-perforating wound of the intestine and a wound of the mesocolon involving a large vessel, in a third to that of a non-perforating wound of the intestine and in a fourth to a wound of the spleen without any intestinal lesion. That balls may pass through the abdominal cavity in the human, without producing an in-

jury to any of the contained viscera, is mentioned by different authors; and while there remains no doubt of the possibility of such, experience has abundantly proven that it is by far the exception and we may safely conclude that when a ball has entered the abdominal cavity that injury to one or more viscera has occurred. And when we consider the anatomical arrangement of the contained viscera it is not difficult to see why such should almost inevitably be the case and only where the path of the ball is superficial or tangent to the abdominal wall does escape at all seem possible.

Following the perforation of the intestine generally occurs an ectropion of the mucosa which as a rule corresponds in degree to the size of the opening.

Notwithstanding the great uncertainty of the wound of entrance as a guide to the injury within, a study of the same should not be overlooked, since it not only furnishes inferences of the probable injury but is often of value to the surgeon as an aid in more readily determining the source of the severe hæmorrhage.

The opinion among surgeons seems to differ upon the relative frequency with which extravasation complicates perforations of the stomach and intestines. By many it is held that such is the rule, while the experiments differently made upon lower animals decidedly point to the contrary, and also in the human subject the cases are not sparing where not only large as well as multiple openings existed without any extravasation occurring and in spite of the fact that the bowel contained much feculent matter. It is the opinion of Sir William MacCormac<sup>1</sup> that experience teaches that fæcal extravasation follows in ninety-nine out of every one hundred intra abdominal injuries, but no mention is made of the time that passes before the escape, and Otis, in the "Medical and Surgical History of the Rebellion," expresses a like opinion that in the vast majority of cases extravasation follows. It is to be regretted that in the cases so far reported very little is mentioned of this as a complication to the injury, since it is only by a study of a large number of cases that this question can

<sup>1</sup>Klin. Zeit. und Streitfragen, p. 357, bd. 2, hft. 10.

be satisfactorily answered. In thirty-two of the containing experiments nineteen were attended with extravasation and of this number it was the exception for such to occur before handling of the intestine was commenced. Erichsen assigns three principal causes that tend to prevent extravasation: (a) Ectropion of the mucosa. (b) Closure of the opening by the contiguous coils of intestines. (c) Arrest of the peristalsis from the shock of the injury.

In the experimental work it was not an uncommon occurrence to notice a perceptible impression upon the animal immediately after the reception of the injury. Occasionally the intestines were found almost throughout in a state of contraction or in portions alternately contracted and dilated and where this contraction existed it never failed to undergo relaxation upon exposure and handling. In the absence of interference, that extravasation should be the ultimate outcome of perforations of the intestines is not difficult to see, yet there is no doubt that a large number of the cases that fall into the hands of the surgeon during the first twelve hours are devoid of this complication and the chances of immunity increases with the promptness of the interference and the enjoining of absolute quiet on the part of the patient.

Based upon an analysis of 253,142 cases of shot injuries occurring in the late war, Otis<sup>1</sup> placed the frequency of those occurring in the abdominal region at 3.3%, or one in twenty-nine. The following aggregate of 1,072 cases of known injury to the abdominal viscera represents the relative frequency with which the different viscera were injured.

<i>Wounds.</i>	<i>Cases.</i>	<i>Ratio of Mortality of Determined Cases.</i>
Intestines, - - - - -	653	80.3
Liver, - - - - -	173	63.5
Stomach, - - - - -	79	75.9
Kidney, - - - - -	78	66.2
Blood Vessels, Omentum and Mesentery.	54	87.
Spleen, - - - - -	29	93.1
Suprarenal Capsule, - - - - -	1	100.
Pancreas, - - - - -	5	80.
Total, - - - - -	1,082	

<sup>1</sup>Med. and Surg. History of War of Rebellion. 2d Surg. Vol.

While the table prepared by Otis from which the above is an extract may in certain particulars be doubtful, it gives at least an approximative idea of the relative frequency with which the different organs are injured and from the above it is apparent that the chances of injury to any certain organ increases with its size and superficial location.

Intestinal injuries involving the mesenteric border are often attended with profuse hæmorrhage, the same is true of wounds of the stomach near the curvature.

Wounds of the spleen and liver are always attended with hæmorrhage and where the injuries are severe there is danger from this source of death primarily, and in addition to this in the latter organ authors lay great stress upon the irritating effects of the bile upon the peritoneum. Such, however, was not the experience in these experiments and it is mentioned in the history of the civil war that the experiments upon lower animals by Höring, Herlin and Campaignac indicate that the irritating action of bile upon the peritoneum is overrated, and that some of the facts observed during the war point in the same direction.

Wounds of the pancreas are generally above the others in gravity because of its deep location and the close relation to important vessels. Injuries of the omentum and mesentery are regarded as serious only when they are attended with hæmorrhage. Of the solid viscera mentioned in the experiments the spleen was wounded in nearly half. This was partly due to the transverse direction of the balls, but principally to a very much enlarged condition of this organ that was not uncommonly met with in these animals.

In a series of five experiments the "do-nothing" plan was carried out with a view of studying nature's method of repairing these injuries. Of these four resulted in death, and the fifth made his escape in a week's time in a condition which left no doubt of his recovery. However, in this case the course of the ball was so superficial, and the resulting effects so slight, that it is believed that the ball either failed to enter the abdominal cavity, or if it did so, its course was such a superficial one as to pass above the contents.

Observations, experimental and otherwise, lead to the belief that where unaided repair results, nature effects this in some of the following ways: (*a*) Closure of the perforation by an adhesion to a neighboring coil. (*b*) An omental adhesion. (*c*) By an adhesion to the abdominal wall. (*d*) Only where the opening is minute by an exudate of plastic lymph. In the experiments terminating in recovery, subsequent examination showed that peritonitis had occurred in nearly all. Generally this was circumscribed, but in a few it extended over the whole peritoneum, and in one the adhesions were so extensive that the whole of the intestines were adherent in one solid mass, and were so removed. Notwithstanding the recent deformity that followed the closure of intestinal wounds, permanent coarctation was rarely observed, and then only in a slight degree.

#### SYMPTOMS, DIAGNOSIS AND PROGNOSIS.

As for the symptoms, they may be conveniently divided into the primary, or those referable to the injury itself, and the secondary, or those referable to the complications consecutive to the injury. The symptoms of the first class can be mentioned as those relative to the constitution at large and those of a local nature.

The constitutional symptoms here are the well known symptoms of shock, the same as the symptoms of severe injuries elsewhere. Although shock, in a more or less degree, is a common attendant upon these injuries, its absence, even in severe cases, is not infrequent, and it has been noted that in many cases there exists a marked disproportion between the injury and the shock. Even when attended with severe hæmorrhage, there may be a comparative absence of the symptoms relative to the same, an example of which occurred under the observation of the writer during a service as interne at the Louisville City Hospital.

An athletic negro, of apparently 20 years, was found reclining upon a porch, talking to his friends in a very rational manner, with little or no evidence of severe injury. Subsequently upon arrival at the hos-

pital it was found that a ball of a .32 calibre had entered the left hypochondriac region, passing downward, backward and inward, lodging itself against the body of a lumbar vertebra, and in its transit half severing the descending colon and a lumbar artery near its origin, completely filling the cavity with blood. Notwithstanding an operation upon entrance by the visiting surgeon, the man sank 12 hours thereafter from hæmorrhage.

Prominent among the local symptoms are vomiting, pain, abdominal distension, with or without loss of the area of hepatic dulness, the escape of blood, bile or fæces from the external wound, and in wounds of the kidney or bladder, bloody urine. The vomit may or may not contain blood, and if the latter, it generally indicates a perforation of the stomach, but the same may also result from a non-penetrating wound of this organ. The pain is variable, and often severe, and localized in character. Abdominal distension with loss of the area of hepatic dulness indicates the escape of gases into the peritoneal cavity. Tympanitis without such indicates an accumulation within the intestinal cavity, and may occur in the absence of a lesion. When unmistakable escape of bile or fæces occurs externally, it is a positive proof of a wound of the liver or intestines. With the exception of a few drops, hæmorrhage from the external wound seldom occurs. Bloody stools, or hæmorrhage within the rectum, may also occur in perforations as well as partial divisions and contusions of the intestines, and when its occurrence is rapid it points to injury of the large intestines.

Unless the case be one that tends to an uneventful recovery, the secondary symptoms worthy of note are generally those of peritonitis, septicæmia, or pyæmia, the symptoms of which are already too common to require repetition here. Occasionally, however, an intoxication is met with to which Vechére has given the name of intestino-peritoneal septicæmia, and for a review of the latter I refer to the article by Stimson<sup>1</sup> on the same subject. The author's language of the review is borrowed here at length.

<sup>1</sup>New York Medical Journal, 1889. Vol. II.



"This intoxication, which has variously been termed peritonism, latent peritonitis, or the asthenic form of acute peritonitis, is supposed to have its origin in an infection of the peritoneal cavity by intestinal gases or microbes that have escaped, either through an opening or by transudation through the unbroken intestinal wall, and by this is set up a fermentation which produces ptomaines whose absorption is the immediate cause of the poisoning. The autopsy reveals but slight redness of the peritoneum, or possibly one or more points of distinct inflammation, and sometimes a brown foetid effusion. The intestines are distended and decomposition advances rapidly. The clinical features are a prompt and marked meteorism, painlessness of the abdomen, both spontaneous and on pressure, except for that which is due to the wound of the parietes when present; a normal, subnormal or but slightly elevated temperature until shortly before death, when it rises rapidly; a small rapid pulse, anorexia, thirst, nausea and even vomiting of a faecal like matter, and a marked alteration of expression. Its course may be marked during the first three or four days only by constipation, anorexia and meteorism. Then the severe symptoms and death follow in from five to twelve days from the beginning."

Owing to the uncertainty which surrounds the symptoms it is plainly evident that a correct diagnosis of the exact nature and extent of the injury is impossible. In those cases attended with hæmatemesis, bloody urine or the indubitable escape of bile or fæces from the external wound it is safe to infer that the ball has entered the cavity and with more or less injury to the organs to which the symptoms point. However, the first two only occur in injuries of the corresponding viscera and their absence is no positive sign of the escape of these organs, and, as to the escape of bile or feces from the external wound, unless such is very large, this rarely occurs.

In view of this uncertainty, Dr. Senn has devised a so-called "Infallible Test," for the diagnosis of an injury of the gastrointestinal canal and as a guide to the surgeon in determining his course in these cases.

The test in question is already too well known to require more than a passing introduction here, and consisting, as it does, of a rectal insufflation of hydrogen with its escape and

ignition at the external wound. Besides the functions of diagnosing a gastro-intestinal perforation, it is also used at the completion of the operation to determine whether or not the gastro-intestinal canal is again intact.

The test is yet of a comparatively recent origin and since the recorded cases of its use are but few, its precise merits, or demerits, are yet unknown. So far the following objections have already been urged against it. First, that it is unreliable. Second, in the absence of gastro-intestinal injury there may be serious damage elsewhere which the test does not indicate. Third, that it may be the source of infection. Fourth, by the distension of the abdominal cavity it materially increases the danger of the anæsthesia. As for the first objection, the case of Dr. Dalton<sup>1</sup> clearly proves that the test is not infallible and the records abound in a number of cases where the damage was confined to the mesentery or some of the solid viscera, producing a condition beyond the reach of the test.

Dr. Senn has remarked that the gas is innocuous and does not tend to increase extravasation, but this is questionable. It does seem that where the perforated large intestine, especially the cæcum, is well filled with liquid or semi-solid fæces that extravasation would almost inevitably follow the use of the gas, since the ileo-cæcal valve offers a certain amount of resistance before it gives away, which pressure it appears would be sufficient to drive out some of the contents. This exact condition was met with in experiment 17, and, although the apparatus was not at hand for its trial, it was interesting to note the amount and ease with which extravasation occurred. Moreover, some have even objected on the ground that the gas when it enters the peritoneal cavity is hardly aseptic after passing through many feet of intestines, although in the event of a perforation the insufflation is followed by an immediate laparotomy, which would allow but a momentary residence of the gas in the peritoneal cavity. That the abdominal distension with its corresponding pressure upon the diaphragm materially

<sup>1</sup>Western Medical Reporter, October, 1889. P. 218.

increases the danger of the anæsthesia is also proven in the case reported by Dr. Dalton. The test was experimentally employed here six times; in five, hydrogen was used and in the sixth it was replaced by air. In three of the five it was a success, noting in one the absence of any perforation, while in the other two it escaped and burned in a jet.

The remaining two could not be insufflated, owing to a perfect occlusion of the intestinal lumen with fæcal matter. Several attempts were made to overcome the obstruction with different tubes and rectal plugs, but without success, and it became evident that nothing short of its removal would suffice. The one in which there was an absence of a gastro-intestinal perforation, was corroborated by an abdominal section, and when the search was finished it became somewhat troublesome to reduce the distended intestines.

The danger of an explosion, as well as poisoning from arseniuretted hydrogen, have also been hinted, but these cannot be fairly urged against it, since, of the first sufficient evidence is at hand to allay any fears in this direction and if the reagents are chemically pure, as recommended, the second is impossible. But further on more can be seen upon this subject.

Reflection bespeaks a serious condition even in the most favorable cases, and, naturally, the prognosis increases in gravity with the extent of the injury. Although there is recorded a successful case<sup>1</sup> in which laparotomy was not undertaken until the fifth day, the importance of an early operation cannot be too strongly urged.

Procrastination in these injuries is usually repaid with a liberal share of harmful consequences.

Death very soon after the injury is generally either from hæmorrhage or shock and not infrequently the latter is very much dependent upon the hæmorrhage. When death occurs later it may be due to peritonitis or more generally from some of the septic processes already named.

#### TREATMENT.

The treatment divides itself into three indications. First, to

<sup>1</sup>Klin. Zeit. und Streifragen, bd. ii., heft. 10., s. 355.

determine the penetration of the ball, together with the presence or absence of any intra-abdominal injury. Second, to correct the intra-abdominal injury, and third, the treatment of the complication secondary to the injury. For the fulfillment of the first indication we have at hand two procedures, Senn's rectal insufflation of hydrogen and laparotomy. As for the choice between these two, laparotomy, boldly but carefully performed, seems decidedly the most preferable, for when the *ensemble* of objections urged against the test are considered the advantages of its use are not sufficient to outweigh the harm that may result. According to Trélat,<sup>1</sup> intra-abdominal injury follows in 97 out of 100 perforations, and drawing a more liberal margin of 95 in 100 would leave but 5 out of 100 in which the operation was purely exploratory.

Although the dangers of a simple laparotomy, even in a subject otherwise healthy, are not to be denied, yet where the precautions against infection are scrupulously observed the mortality will be exceedingly low and the operation certainly seems a justifiable step in the face of what was reasonably supposed to be a very serious condition. Nor does the medico-legal aspect appear to suffer any improvement by the general adoption of the test since in consideration of the objections already offered the test in the event of an unfavorable termination where intra-abdominal injury is present, may possibly give rise to the same debatable questions that attend an unfavorable exploratory operation without intra-abdominal injury.

In every case that laparotomy is undertaken it should be with the preparation and expectation of finding intra-abdominal injury. By most surgeons the laparotomy in the linea alba is given the preference over that of one performed in the course of the ball since occasionally the course of the latter is such that its following is inadmissible and often it necessitates the making of very large and undesirable incisions, while a laparotomy in the linea alba not only furnishes the easiest access to all the organs but also its making is attended with less hæmorrhage, and is generally a more desirable wound for closure and subsequent treatment.

<sup>1</sup>The Medical and Surgical Reporter, May 12, 1888.

However where it is highly probable that the ball has become arrested in the abdominal parietes, or where infection of its track is suspected either from the use of the probe or fragments of clothing carried in with the ball, incision and drainage should always be employed, not only for diagnostic purposes but also for the proper treatment of the bullet wound under such circumstances. But only where the ball is very small and given at a long range with a transit through several layers of clothing or a very thick abdominal wall can its arrest without penetration be hoped.

Ordinarily probing of the bullet wound should be carefully avoided, for the cases of non-penetration when the abdominal wall is fairly wounded are extremely few, and the experiences of Esmarch and others have conclusively proven this a source of infection in all gun-shot wounds. In all of the experiments the abstention of interference with the bullet wound was followed by an absence of suppuration from this source.

Following the opening of the abdominal cavity comes the search for and repair of the intra-abdominal injury. The search for the wounds of the gastro-intestinal tract may either be made through a large incision with "eventration" or through a small one hooking up a coil of the intestine and carefully tracing the whole tract from end to end. The apparent advantages of the former are, that it affords an easier access and better command over the whole of the intestines and their attachment. Both have been employed in the experiments and each seems to have its advantage. Where there is profuse hæmorrhage or extensive damage of the intestines with danger of extravasation "eventration" would be the shortest way of locating the hæmorrhage, and the best control over extravasation, but where upon opening the cavity it is apparent that little or no hæmorrhage has occurred a loop of intestine can be carefully hooked up through a small opening, and the whole intestinal tract examined without exposing more than about six inches at one time. In those cases where from the wound of entrance and exit the other organs can be safely excluded from the path of the ball such an examination will suffice; otherwise if necessary the incision can be enlarged till a

satisfactory ocular or digital examination will prove the absence of injury to any or all of the other viscera.

My co-worker, Dr. Vance, ingeniously unbent and covered the ordinary safety pin with rubber tubing or fine catheter and by piercing the mesentery on each side of the wound where it is devoid of vessels has succeeded in sealing the wound against extravasation during the examination or closure of any intestinal injury. The principle has been found to be advan-

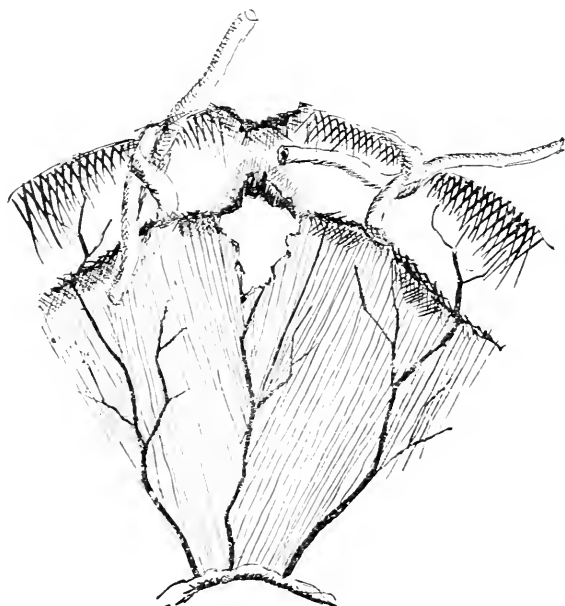


FIG. 3.—SHOWING THE APPLICATION OF THE RUBBER TUBING FOR CONTROLLING FÆCAL EXTRAVASATION.

tageous, but owing to the projecting points of the pins which frequently caught and damaged the omental folds and mesentery the latter was found somewhat impracticable and in lieu of which, the writer substituted ordinary small rubber tubing as shown in Fig. 3, which can not only be used for the purpose already named, but from its simplicity and cheapness will afford an admirable substitute for the many clamps already suggested for the control of extravasation during re-

section and other intestinal operations. In its application a single knot will suffice and too much traction should be avoided.

The injuries of the intestinal tract may be variable in character. For clinical and prognostic purposes they can be arranged as contusions, penetrating and non-penetrating wounds. The contusions are often quite large and attended with corresponding hæmatomas. The penetrating wounds for the purpose of treatment admit of the division into those isolated from and those involving the mesenteric border. By the latter is meant such as encroach upon that portion of the intestine which is devoid of serous covering, and contained in the triangular interspace formed by the union of the two folds of mesentery

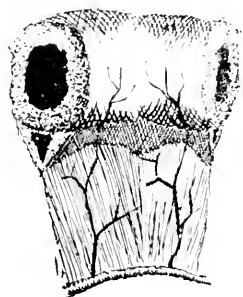


FIG. 4.—SHOWING THE ABSENCE OF THE SEROUS COVERING AT THE MESENTERIC BORDER OF THE INTESTINE.

see Fig. 4. Because of this absence of the serosa, which precludes the possibility of obtaining "plastic adhesion" in a few hours, which is so indispensable in intestinal suturing, as well as the interference with the blood supply of the intestine which attends wounds in this location, they are justly to be regarded as the most serious of intestinal wounds. Space will not permit a review of the various mechanical measures already recommended, for the care of intestinal injuries and the remarks in this direction will be confined to such as by the present opinions are deemed most efficient and advantageous. Hæmatomas were frequently met with at the intestinal border

of the mesentery and sometimes about the intestine proper. When unattended with a wound they were left untouched without any harm resulting, but in the reverse for additional security, they are best treated as a perforating wound.

For the closure of intestinal wounds various stitches have been recommended, prominent among which are the Lembert, Gely, Gussenbauer, Czerny and the continued suture. Of these nearly all have been experimentally employed, and as for safety, simplicity and efficiency none recommends itself as strongly as the Lembert stitch. The latter when applied, should not be too far apart (3 or 4 lines), and to insure security should not include too narrow a strip of the serous surfaces. Unless the wound be linear in character the stitches are best introduced parallel with the long axis of the intestine, since by such its lumen suffers least from coarctation.

In tying the sutures only sufficient traction should be employed to bring the opposite sides in contact. This apposition is soon followed by a slight œdema and the commencement of exudation which adds to the safety of the closure. The secure closure of the wound, particularly at the angles, is sometimes misleading. In at least two experiments death was due to an infection traceable apparently to this source. Unless the edges of the wound are so ragged and everted as to interfere with their closure trimming is unnecessary and superfluous. It has been noted in several of the experiments that were followed by early deaths that these edges level themselves into rounded ridges on each side of the wound during the first 24 hours after their closure, Fig. 5 (*a*). According to Lembert the stitches ulcerate their way into the intestinal cavity by the seventh or eighth day, and are discharged. It was repeatedly noticed that in 36 or 48 hours sufficient exudate was thrown out to cover the entire suture externally. In gunshot perforations the mucosa was frequently observed in those cases where death followed during the first 24 hours to be denuded of its epithelial layer for four or five lines beyond the opening, with a slightly congested zone for its boundary. Where the stitches were introduced entirely through the muscularis "or deeper," they were generally visible internally



within 24 hours thereafter, but in those introduced merely through the serosa, or the serosa and partly through the muscularis, they were nearly always to be found encysted beneath a layer of fibrin a month or more subsequently, with hardly any change in their condition. Possibly later on, through a process of maceration and absorption, they disappear.

The needle found most suitable was that known as (Milward & Son) the milliners' needle, which is a long narrow needle, devoid of cutting edges. The earliest, and perhaps second in choice, of the intestinal sutures is the continuous or glove-

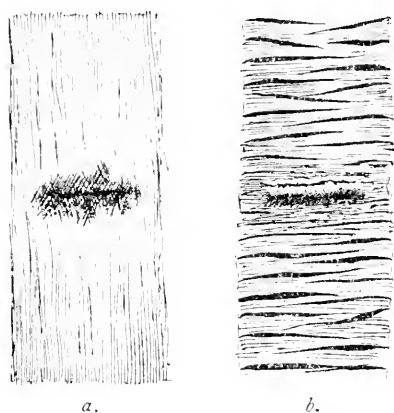


FIG. 5.—*a.* SHOWING THE INTERNAL APPEARANCE OF A SUTURED WOUND AT THE CLOSE OF 24 HOURS. *b.* SHOWING THE EXTERNAL APPEARANCE OF THE SAME.

ers' stitch, which, in view of its simplicity and the rapidity of its application, is even preferred by some to that of the Lembert, but the main objection against it as a substitute for the latter is that tearing of a single stitch results in the loosening of the entire suture, and since the purchase generally obtained is not very strong, this can very easily occur. However, in those cases where the wound does not penetrate all the coats of the intestines, or from some reason it becomes necessary to bring the operation to a rapid completion, Nussbaum recommends the preference of this suture. Such wounds as are isolated from the mesenteric border, and of an ordinary size, are easily closed without any further preparation of their condition, but

where they are of such a nature as in Fig. 2, a triangular excision leaving the mesenteric attachment intact was followed by the best results, Fig. 6.

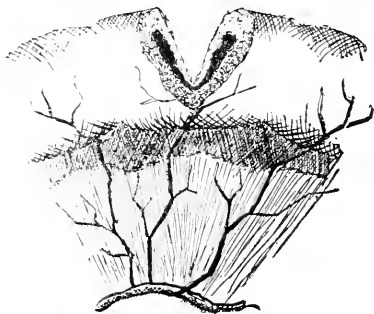


FIG. 6.—TRIANGULAR EXCISION OF THE WOUND.

Wounds upon the mesenteric border are always troublesome, and since excision upon the concave border is inadmis-



FIG. 7.—WOUNDS CREATED BY A FLOBERT. ONE OF WHICH SLIGHTLY INVOLVES THE MESENTERIC BORDER.

sible they frequently require complete resection. Those of a small size are conveniently closed by drawing together a fold

of the mesentery upon one side and the border of the intestine upon the other, but in those of a complete division of the mesenteric border, as in Fig. 3 and 8, resection is the only alternative. In re-uniting the divided ends of the intestine the operator has the choice of three methods, circular enterorrhaphy by the Lembert or Czerny-Lembert suture, invagination as recommended by Senn, which is but a modification of the same step by Baudens and Jobert, or lateral anastomosis by absorbable plates. Although experience has hardly established the comparative value of these, the lateral anastomosis

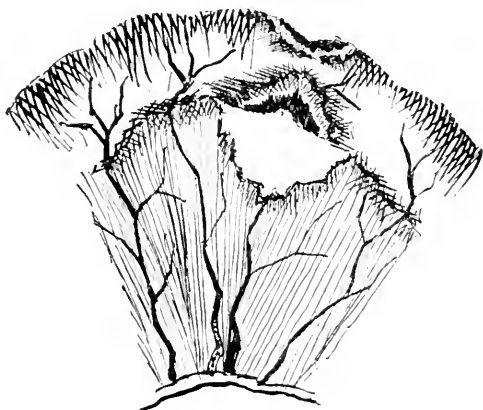


FIG. 8.—SHOWING TYPICAL INJURY OF THE MESENTERIC BORDER, REQUIRING A COMPLETE RESECTION.

as revived by Dr. Senn seems to be the operation of the day. When a small portion of the intestine is resected this can be accomplished without interfering with the mesentery, but in resections of two or more inches it should be accompanied with an excision of a corresponding triangle of the mesentery. Where a number of large wounds are situated close together, they are best dealt with by a single resection, including them all.

Non-penetrating wounds of various sizes and depths were repeatedly left untouched for a test of their security, and while no harm was traceable to them, still the safest method of their

treatment consists of their closure just as in penetrating wounds. In eventration the intestines during manipulation are best protected from shock by covering with disinfected towels which are kept warm by continuous irrigation of warm sterilized water, or, as was practiced in the experiments, by pouring from time to time warm sterilized water over the mass from a suitable vessel.

After all the discovered wounds are closed, a diligent and painstaking search of the entire gastro-intestinal tract should be made for any additional injury that possibly has escaped, and for the detection of such, as well as to prove the security of the intestinal closure, Senn's test is again recommended. The objections urged against the test as a diagnostic means of determining the necessity of a laparotomy cannot, at least in the same degree, be urged against it for this purpose.

So far there has been, to my knowledge, one case reported by Dr. Senn in which the test, in addition to eleven perforations, detected a twelfth, low down in the pelvis, which otherwise would have escaped, the patient recovering. Against this is the case reported by Dr. Dalton, in which this method of testing the gastro-intestinal tract occasioned serious damage by so distending the intestines that their return was exceedingly difficult, and even provoked a rupture of the sutured parts, seriously crippling the chance of recovery, the case terminating in death. In addition to the latter is another, occurring under the observation of Dr. Fenger,<sup>1</sup> in which, notwithstanding the use of the test, at the close of the operation an opening at the pyloric end of the stomach escaped. The following extract from the writer's language explains itself:

After all the apertures found were closed and the vessels tied, the intestines were replaced and gas again insufflated. The sutures proved to be absolutely air-tight. Some bubbles, however, escaped from the upper extremity of the incision, but Dr. Fenger thought that it came from the peritoneal cavity. The abdomen was flushed "et cætera." Autopsy one hour after death. On removing the intestinal tract the following appeared: (After reciting in detail the appearance the writer

<sup>1</sup>J. L. Hillmantel, Jour. Am. Med. Ass'n, July 21, 1888.

closes the autopsy as follows:) The second lateral apposition was found 11 inches below pylorus, where  $2\frac{1}{2}$  inches of gut, with four perforations, had been resected. Finally, a perforation was found in the pyloric end of the stomach which was not sutured.

In the face of these two cases, the value of this method, as it now stands, is certainly questionable, since, in the first, it clearly points to a serious possible danger which has not only already occurred with Dr. Dalton, but Dr. Senn himself alludes to it as having been annoyed by the same thing, and in the second case its absolute certainty is very strongly shaken. Although apart from its not being absolutely infallible, if some means were at hand to rapidly relieve the distension, the test might prove itself a valuable adjunct to a careful research in detecting any additional perforation that might possibly have escaped. In a single experiment for the purpose, an incision was made into the large intestine with the hope of relieving the distention, but owing to acute flexures caused by the distention, this end was not reached till another was made into the small intestines, and a third into the stomach, the latter organ being partly filled with large pieces of meat, which prevented the exit of the gas through the pylorus, upon pressure. Judging from this, a simple incision which can be made under the control of the surgeon will hardly overcome the difficulty.

*Wounds of the mesentery*, when they are but perforations, can be passed without any additional interference, unless attended with hæmorrhage, in which case deligation of the injured vessel is required. Large lacerations should be closed with a running suture to avoid the future possibility of an incarceration and obstruction of a loop of the intestine in the opening. On account of the extreme delicacy of the membrane, its closure is often attended with some difficulty, which can be frequently overcome by introducing the sutures near the edge of a vessel, as this region affords the strongest grasp for the suture.

*Wounds of stomach* are treated according to the same rules as apply to injuries of the intestines.

*Wounds of the liver.* The recent advances in hepatic surgery by Tait, Langenbuch, Burkhardt and others show that the fear

from hæmorrhage, sepsis and the deleterious effects of bile upon the peritoneum are very much exaggerated. Lawson Tait<sup>1</sup> has a number of times successfully performed hepatotomy, removing from the liver substance immense quantities of hydatids. Burkhardt<sup>2</sup> succeeded in arresting a furious hæmorrhage from a stab wound of the liver by a tampon of iodoform gauze, and Dr. L. MacLane Tiffany<sup>3</sup>, in two operative cases, resorted primarily to the step of isolating an area of liver substance by uniting the edge of the parietal peritoneum with the surface of the liver, and through this extra-peritoneal area in one case he incised an abscess, and in another removed gall stones from the gall bladder, directly through the liver substance.

The wounds of the liver proper may either be simple abrasions, such as are produced by the ball glancing over its surface; clean cut perforations, or perforations attended with the loss of more or less liver substance. In abrasions of the liver the sear of the Paquelin will suffice, but generally the hæmorrhage ceases of its own accord. Such perforations as are hardly any larger than the ball itself are best controlled by closure of both openings with a continued catgut suture, introduced to the depth of two or three lines, and repeated two or more times after the weaving of a net work over its orifice. In the event of its failure to arrest the flow, or in perforations attended with the loss of hepatic substance, a tamponade of iodoformized gauze is the last resort. In perforations or lacerations at the free border of the liver, a V-shaped excision of the whole, uniting the surface with a running suture upon both sides, and if necessary doubly applied, recommends itself.

In wounds of the gall bladder, the closure of the apertures is best effected by either the Czerny or Rydygier's modification of the latter, using the continued suture in the first row, and the Lembert in the second. Before closure, unless already empty, evacuation and disinfection of the gall bladder should be observed.

<sup>1</sup>Diseases of the Ovaries. Tait.

<sup>2</sup>Jour. Amer. Med. Ass'n, Vol. VIII, p. 323. Vol. IX, p. 62.

<sup>3</sup>Loc Cit. Jour. Amer. Med. Ass'n, Vol. X, p. 785.

Cholecystenterostomy and cholecystectomy are operations to which the surgeon may be forced in the exigency of the case.

The experiments by Dr. Nicholas Senn<sup>1</sup> upon the pancreas have markedly advanced the surgery of this organ. They have shown that the tail or a portion of the body can be unhesitatingly removed, but operations upon the head should be of a conservative nature, not only for the purpose of sparing the common duct, but also as much of this portion of the organ as the conditions which necessitate the operation will permit. The complete extirpation of the pancreas was invariably followed by death, produced either by traumatism or gangrene of the duodenum. In transverse visceral wounds the arrest of hæmorrhage is the most important indication, and the suturing of the divided organ is advised with a view to preserving as nearly as possible the integrity of the blood supply rather than to secure the continuity of the pancreatic duct which, in division, uniformly results in an occlusion from a cicatrix. In case of extreme crushing, the indication is to remove the crushed portions after preliminary ligation of the organ on each side of the comminuted region. In using the double ligature the experiments show the safest plan to consist in the removal of such portions as are not supplied by blood vessels, rather than to trust to their absorption with the risk of proving a nidus for infection. In partial resections for injury or disease, ligaturing the peripheral portion and allowing it to remain is recommended as the most preferable step, since it lessens the danger by the infliction of less traumatism, and its removal in a short time, by absorption, can be confidently expected. It has also been demonstrated that no fear need be entertained of a retention cyst forming in the peripheral portion, even though some of the parenchyma of the organ remains,

*Wounds of the spleen.* In superficial abrasions, such as are produced by the glancing of the ball over its surface, the sear of the Paquelin, just as in lacerations of the liver, will usually

<sup>1</sup>The Surgery of the Pancreas as Based upon Experiments and Clinical Researches. Transactions of Amer. Surg. Ass'n, 1886.

answer, but where the injury is of a severer nature, there are several procedures open. Should it consist simply of a perforation without much laceration of splenic structure, closure of both openings of the track with a continuous suture was uniformly successful when applied. In a perforation or laceration very near or involving the edge of the spleen, its excision in the shape of a triangle, uniting the edges with a running suture, is the most advisable step. Where the perforation involves a large vessel which precludes the closure of the track, or where the laceration is such that excision is unfeasible, the complete removal of the organ is required. It was observed that in partial resection or where the closure of the perforation with the suture was practiced, that the spleen rapidly increased in its size below the point of interference, as well as suffered a change in its color.

The changes which were apparently due to an interference with the venous circulation in the organ never gave rise to any trouble, and with the exception of one or two cases, upon subsequent examination, no traces of them were left. The changes which were apparent in the exceptional cases consisted of a slight atrophy, with a darkening in the color.

*Wounds of the kidney and bladder.* Unless the injury consists of a superficial laceration nephrectomy is as yet the only procedure in the treatment of these wounds. The superficial lesions are treated just as the similar injuries of the spleen and liver. The steps recommended for the repair of the gall bladder are also applicable to perforations of the urinary bladder.

*General precautions.* The last of the three leading indications is the treatment of the suppurative peritonitis that may follow consecutive to the injury. The treatment of this embraces prophylactic as well as curative measures. It is almost superfluous to repeat here that the strictest observance of the rules of antiseptis is of the utmost importance. Whether or not it is positively known that extravasation has occurred the cavity at the close of the operation should be carefully washed out with warm Thiersch's or some other suitable solution, and after drying close with the introduction of a glass or non-collapse drain which is so arranged that without disturbing the



dressing access can be had to the abdominal cavity and if necessary the removal of any secretions affected. If the removal of such in this manner is insufficient, "febrile symptoms, tenderness, and tympanitis developing on the first few days after the operation," Gerster<sup>1</sup> favors the use of salines as advised by Tait. The track of the ball, which is another and not uncommon source of infection, can nearly always be sealed from within by its closure with two or more stitches applied after the manner of Lembert and where infection is probable should be treated externally by incision and drainage.

In the event of suppurative peritonitis having made its appearance, early opening and disinfection of the peritoneal cavity is indicated and for this purpose Mikulicz<sup>2</sup> and others have divided the peritonitis into two types. "*Diffuse, septic and progressive fibro purulent peritonitis*," both distinct but capable of merging into one another, the former being an acute or per acute peritonitis dependent upon the infection of a large portion of the peritoneal surface, which, unless it runs a per acute course with the symptoms of intoxication, is marked by the attendance of a variable amount of sanguino-serous or purulent putrid thin fluid exudation. The peritoneum is injected and at times covered by a thin fibrinous, deposit but firm and extensive adhesions are absent. The latter runs an acute or subacute course with infection limited to the vicinity of the perforation by the adhesions formed from the fibro-purulent exudation.

The process successively spreading with the encapsulation of more or less pus between the glued viscera.

For the first Mikulicz advises that of freely opening the abdomen with the finding and closure of the opening (if there be one) and the disinfection of the peritoneum.

In the second each intra-peritoneal pus cavity is opened separately by the free incision of the abdominal wall where it appears most prominent, and, following the incision, carefully washed out avoiding the rupture of the adhesions and in lieu of closure by sutures loosely packed with iodoform gauze

<sup>1</sup>Loc. Cit. *Annals Surgery*, Jan. 1887, page 27.

<sup>2</sup>Gerster's *Aseptic and Antiseptic Surgery*.

with the possible introduction of a drain. Upon this principle Mikulicz has operated with some success, using as diagnostic indications the increased resistance, pressure sensitiveness, dullness and an increase of the previously lowered bodily temperature using in doubtful cases the exploratory puncture.

Dr. Wylie<sup>1</sup> in a recent and advanced paper upon this subject assumes a similar position as Mikulicz, strongly favoring early interference in the treatment of peritonitis. The succeeding lines represent an abstract from this writer's conclusion after an experience of several successful cases.

When there are symptoms of local peritonitis, intense pain and tenderness followed by tympanitis and vomiting with chilly sensation and rise of temperature, search should be made for the cause. If signs of a tumor or exudation can be definitely made out and the general symptoms indicate the formation of pus then the patient should be etherized and the pus reached by incision, the pus evacuated, the cavity washed out and drained. If the general symptoms are severe and no localized center of pus is made out then an incision should be made in the median line and the peritoneal cavity explored with the index finger. If then a pus sac is found, if it be so situated that it can be reached by another lateral incision and the pus evacuated without allowing it to escape into the free peritoneal cavity, it should be made and the median incision closed. If it cannot be reached by a lateral incision where the wall of the sac is adherent to the abdominal wall then the pus should be drawn off by an aspirator or trocar and the cavity washed out clean with an antiseptic solution before it is freely opened and a drainage tube inserted.

If signs of general peritonitis show themselves, that is by vomiting, obstinate constipation, tympanitis etc, then a free incision should be at once made into the median line and the starting point of the peritonitis found if possible. If it is over the cæcum an incision should be made and the pus washed out by means of hot water of a temperature of 110° to 115° from a large fountain syringe with a large glass drainage tube attached to the rubber. After the free pus about the cæcum is washed out several fingers or the whole hand should be put into the abdominal cavity and the intestinal adhesions broken up and

<sup>1</sup>The Surgical Treatment of Local and General Peritonitis by W. Gill. Wylie, M.D. The Am. Jour. of Obstet and Diseases of Women and Children, March, 1890.

all puddles of pus completely washed out. Then a drainage tube should be introduced into the opening and the wounds closed around them.

In all cases of general peritonitis an exploratory incision should be made as early as possible after trying to lessen the tympanitis. If an exploratory incision does no good it is not likely to add much to the danger. There may be cases of idiopathic peritonitis but I have never seen one proved by anything to be relied upon. Certainly in septic peritonitis where shock is not too great free opening, washing out and drainage will cure some cases. It helps if it does not cure tubercular peritonitis and exploratory incision has proven to be in the hands of experts almost entirely free from danger and it must become the practice in almost all cases of general and local peritonitis where there are marked symptoms of the formation of pus, an extension "into septic peritonitis or intestinal obstruction."

In closing Dr. Wylie remarks: "What I wish to especially advocate, is early operation in cases of general peritonitis, both those starting from a local peritonitis and those due to the escape of septic matter into the peritoneum, and to make it plain that to succeed in such cases it will not do to merely open the belly, allow pus to escape, put in a drain tube or gauze and leave intestinal adhesions causing obstruction to remain, to kill even more certainly than septic poison or fail to empty and wash out all puddles of septic fluid encysted among the coils of intestines, but we must make free incisions large enough to introduce the hand and break up all adherent intestines and freely wash the whole cavity of the peritoneum and put in two or more drainage tubes."

From a study of the foregoing abstracts it does seem that the indications in the treatment are plain and reviewing the successes achieved by Mikulicz,<sup>1</sup> Krœnlein,<sup>2</sup> Tait,<sup>3</sup> Wylie,<sup>4</sup> Korniloff,<sup>5</sup> and others, this certainly appears the most feasible and justifiable step.

<sup>1</sup>Samml. klin. Vorträge von Volkmann, No. 262.

<sup>2</sup>Krœnlein, Langenbeck's Archiv, Bd. 23, S. 522.

<sup>3</sup>Brit. Med. Jour., 1883, Vol. 304.

<sup>4</sup>The Amer. Jour. Obst. and Dis. of Women and Children.

<sup>5</sup>Medizinskoje obosrenje, 1887, No. 12.

## DESCRIPTION OF EXPERIMENTAL OPERATIONS UPON GUNSHOT WOUNDS OF THE ABDOMEN.

## EXPERIMENT 1.

Aug. 8. Full grown English bull. Weight, 43 lbs. Shot with a S. & W. pistol, .32 calibre. Ball entered at lumbar region, passing obliquely through, coming out on opposite side and burying itself in the table. Laparotomy revealed one non-penetrating and three penetrating wounds of the intestines, and a wound of the kidney. Abdominal cavity filled with blood, which came from the renal wound, but no evidence of fecal extravasation. The penetrating wounds were closed with Lembert stitches, and nephrectomy practiced for the wounded kidney, the ball having passed through its central portion and completely shattered the organ. The ligature, which was a single one, was hardly applied before it slipped and although it was almost immediately seized there occurred a considerable loss of blood with a telling effect. Clots were removed and the cavity repeatedly flushed with warm Thiersch's solution and closed. Hypodermics of whisky, ammonia and digitalis were given, and, in a condition of profound shock, removed to a warm place. Operation lasted one hour. The animal died in six hours without rallying from shock.

Post-mortem. Eight hours after death. Abdominal cavity clean. Intestines distended with gas. Intestinal wounds sealed with inflammatory exudate. Ligations of renal stump unchanged. Death from shock.

## EXPERIMENT 2.

Aug. 15. Medium size mongrel. Weight, 27 lbs. Shot with a flobert, from a Remington rifle. Laparotomy revealed one perforating wound and a wound of the mesenteric artery near its origin from the abdominal aorta, which was not found till after death, the animal dying, just as the abdominal cavity was opened, from hæmorrhage, it being really an unsurgical case.

## EXPERIMENT 3.

Aug. 15. Medium size dog. Weight, 28 lbs. Shot with a flobert from a Remington rifle. Laparotomy revealed very slight hæmorrhage and one perforating intestinal wound which was closed with a continuous stitch. No fecal extravasation. Cavity closed. No shock. Time, 30 minutes.

Aug. 16. Dog escaped from kennel during the night. Drinks freely of milk.

Aug. 28. Dog lively. Stitches removed. Abdominal wound almost entirely healed.

Sept. 3. Perfect recovery. Animal sacrificed to obtain specimen.

Post-mortem. The site of injury was found with difficulty, and showed no scar or infringement upon the intestinal lumen. It was only recognizable from the thread that was hanging from the surface.

## EXPERIMENT 4.

Aug. 22. Full-grown mongrel. Weight, 39 lbs. Shot with a .22 long from a Remington rifle, the ball entering 2 inches to the left and below umbilicus, passing straight through coming out on opposite side. Laparotomy revealed a moderate amount of hæmorrhage and fecal extravasation coming from the intestinal wounds,

which numbered 12 perforating and 1 non-perforating. Resection was performed beginning just below the ileocaecal valve and removing over 4 feet of the small intestine including all but three of the intestinal wounds. Of these three, two were perforating and were closed with a continuous suture; the other was non-perforating and left alone. The resection was performed by ligaturing the mesentery *en masse* at its vertebral border. The ends of the intestines were united after the method of Wölfler. The *toilet de peritone* was carefully done and the other layers closed with a continuous suture. Given six minims of Magendie's solution and several hypodermics of whisky and removed to a warm place in a condition of shock. External heat was applied but the animal only partly rallied.

Time, 1½ hours. Was seen again at midnight. Extremities warm, respiration rapid and shallow, pulse feeble and rapid.

Aug. 23. Found dead.

Post-mortem. Cavity contained about 2 ounces of bloody fluid and a few clots. The mesenteric stump was covered with a blood clot. The resection as well as the other wounds were sealed with exudate and retained air sufficiently to resist some pressure and float when ligated and thrown upon water. Rectum filled with hardened faeces. Death from shock.

#### EXPERIMENT 5.

Aug. 28. Small mongrel. Weight, 18 lbs. Shot with a S. & W. pistol, .22 calibre. Laparotomy revealed the abdominal cavity filled with blood and fecal extravasation. Five perforating and two non-perforating intestinal wounds and a nick in the free border of spleen. Two of intestinal wounds were large and required the resection of one inch of intestine. The others were closed with Lembert stitches. The non-perforating wounds were broad and shallow and were left untouched. Splenic wound being small was disregarded. The principle source of the hæmorrhage was from two of the intestinal wounds that were situated on the mesenteric edge and involved the vessels in that region. The clots were removed, cavity flushed and closed. Was given ¼ grain morphia and alcohol hypodermically and removed to a warm place. The animal being undersize its intestines were small and fragile, all of which served to prolong the operation to 1½ hours. Died 1 hour after removal from table of shock.

Post-mortem. Soon after death. Cavity contained about 1 ounce of bloody fluid and a few clots in the omental folds. Intestinal wounds apparently unchanged.

#### EXPERIMENT 6.

Aug. 31. Full-grown dog. Weight, 38 lbs. Shot with a S. & W. pistol, .22 calibre. Ball entered 1 inch to the right, and on a level with the umbilicus, passing in an antero-posterior direction causing her to wince, and corrugate the abdominal walls. Laparotomy revealed one non-penetrating and four penetrating wounds of the intestine and a wound of the upper edge of the kidney. The abdominal cavity contained but a few ounces of blood but posteriorly was a very large subserous hæmatoma which communicated with the abdominal cavity by the track of the ball. Fæcal extravasation into the peritoneal cavity. Two of the perforating wounds which were in the ileum and required a resection of one inch of intestine which was done after the method of Wölfler, the others were in the cæcum and were closed with the Lembert stitch. The non-penetrating wound being unattended with hæmorrhage was left alone. Nephrectomy was practiced for the wound of the kidney. The

hæmatoma was incised and removed. The cavity flushed with warm Thiersch's solution and closed. The animal was given  $\frac{1}{4}$  grain morphia hypodermically and 1 ounce of whisky per rectum and removed to a warm place, bearing evidences of considerable shock, from which she reacted sufficiently in a half hour to be crawling about. Time, 1 hour and 20 minutes.

Sept. 1. Drank a few ounces milk in the morning, but died at noon after living 20 hours.

Post mortem. Few hours after death. External wound in good condition. Abdominal cavity free from bloody fluid, but contained a few clots. Intestines somewhat matted together and wounds sealed. Renal stump unchanged. Death from an acute septic peritonitis.

#### EXPERIMENT 7.

Sept. 7. Full-grown mangy dog. Weight, 32 lbs. Shot with a S. & W. pistol, .22 calibre. Ball entered 1 inch to the right and a little below the umbilicus. Laparotomy revealed a moderate amount of hæmorrhage, and an oozing of liquid feces. Intestines showed six perforating wounds, one wound to the spleen, and a nick in the free border of the liver. The intestinal wounds were closed with Lembert stitches. The wound of the liver being slight, with the hæmorrhage arrested, was allowed to go untouched. Splenectomy was practiced for the wound of the spleen using a double catgut ligature for its ligation. The cavity was flushed with warm sterilized water and closed. Given  $\frac{1}{4}$  grain of morphia and several hypodermics of whisky and removed to a warm place bearing evidences of considerable shock from which he rallied sufficiently in a few hours time to be crawling about. Seen at 11 P.M., too weak to stand. Operation lasted 1 hour.

Sept. 9. Drank a few ounces of milk, but still too weak to stand.

Sept. 10. Drinks freely of milk, and appears livelier.

Sept. 11. Runs about, and takes liquid food freely.

Sept. 15. Refuses food and appears sick. Removed from the kennel, which afterwards proved to be infected.

Oct. 6. Animal perfectly recovered. Sacrificed to obtain specimen.

Post-mortem. All appearances gave evidence that a general peritonitis had ensued. The lobes of the liver were adherent to each other with a cicatrix at the site of the wound. The intestines were adherent to the abdominal wall and to one another at different places. Splenic stump was not found. All the organs were covered with a perceptible layer of fibrine.

#### EXPERIMENT 8.

Sept. 15. Full-grown part bull. Weight, 37 lbs. Shot with a S. & W. pistol, .22 calibre. Ball entered 1 inch to left and below the umbilicus and was subsequently found on the opposite side, having made a hole in the opposite wall, but fell back into the abdominal cavity. Laparotomy revealed considerable hæmorrhage but apparently no fecal extravasation. Intestines received six large and two small perforations. There were two perforations unaccompanied with hæmorrhage in the mesentery and a small nick of the spleen which was left untouched in the treatment on account of its size and the absence of hæmorrhage. The intestinal wounds were closed with Lembert stitches. Of the mesenteric wounds one was closed with a single stitch. The blood was removed, and cavity flushed with warm Thiersch's solution. Cavity closed and given a hypodermic of morphia and a warm rectal injection of

saline solution and whisky. Removed to a warm place in a condition of considerable shock from which he slowly reacted with the aid of external heat. Operation lasted 1 hour and 20 minutes. Seen at 11 P.M., reacting slowly.

Sept. 16. Unable to stand, but otherwise lively, and drinks freely of milk.

Sept. 17. Gait slow and unsteady. Takes considerable milk.

Oct. 18. Perfectly recovered. Sacrificed to obtain specimen.

Post-mortem. A most extensive peritonitis had ensued in which all of the intestines were firmly bound together in one mass and were so removed. There were likewise adhesions to the liver and the abdominal wall at the seat of the abdominal section.

#### EXPERIMENT 9.

Sept. 21. Small sized terrier. Weight, 17 lbs. Shot with a flobert from a S. & W. pistol, the ball entering one inch to the left and one inch and a half below the umbilicus. Laparotomy revealed seven wounds of the intestine and two of the mesentery. The mesenteric wounds were very much lacerated, one of which being in connection with an intestinal wound and attended with hæmorrhage. Considerable hæmorrhage and fecal extravasation had occurred. The intestinal wounds were closed with Lembert stitches. The wound in the mesentery, which was attended with hæmorrhage, was treated with a ligature; the other was left untouched. The intestines were in sections alternately contracted and dilated, and very fragile. The cavity was flushed with sterilized water, mopped out and closed. Ten minims of Magendie's solution and two drams of whisky were given hypodermically and removed to a warm place in a condition of severe shock. External heat applied, but reaction was very slow and only partial. Because of his small size and old age, he was a very unfit subject. Operation lasted one hour. Death followed in six hours from shock.

Post-mortem. Few hours after death cavity contained a few ounces of bloody fluid. Intestinal wounds agglutinated, excepting the one on the mesenteric border, from which was oozing thick liquid feces.

#### EXPERIMENT 10.

Sept. 22. Full grown mongrel. Weight, 29 lbs. Shot with a flobert from a S. & W. pistol, the ball entering 1 inch to the left and on a level with the umbilicus. Laparotomy revealed a moderate amount of hæmorrhage, and, apparently, no fecal extravasation. The spleen was perforated near its center and the intestines in five places. The splenic wound was treated with a continuous suture on both sides, including upon the inner surface the omentum in the stitch. The intestinal wounds were all small, and closed by Lembert stitches excepting one, which was linear in character, and closed with a running suture in the direction of the long axis of the intestine. Abdominal cavity was flushed, mopped out and closed. Given two drams of whisky hypodermically, and placed aside in slight shock, from which he rallied in an hour's time. Operation lasted half hour.

Sept. 23. Broke from kennel and was found in some high grass some distance away. Refused food.

Sept. 24. Drank a few ounces of milk only.

Sept. 25. Improved. Takes milk freely.

Sept. 30. Apparently recovered.

Oct. 15. Recovered. Killed to obtain specimen.

Post-mortem. Circumscribed peritonitis, extending some distance beyond the original injury. Intestines adherent to the site of the abdominal section, as well as a few adhesions to one another. The injured spots were found with difficulty. Intestinal lumen suffered no infringement, and when split open the sutures were found hanging from the inner surface, ready to be cast off.

#### EXPERIMENT 11.

Sept. 22. Medium size black spitz. Weight, 26 lbs. Shot with a flobert from a S. & W. pistol. The ball entered 1 inch to the left and a little below the umbilicus. Laparotomy revealed three perforating wounds of the intestine, and only a small amount of hæmorrhage. No fecal extravasation. Intestinal wounds closed with Lembert stitches. The abdomen closed without flushing. Given ten minims of Magendie's solution and whisky hypodermically. Removed to the kennel without shock. Operation lasted 40 minutes.

Sept. 23. Escaped from kennel with his companion during the night. Refused food in the morning, but drank freely of milk at noon.

Sept. 24. Appears lively and takes considerable milk.

Oct. 15. Recovery. Killed to obtain specimen.

Post-mortem. The only observation of any note was a circumscribed peritonitis at the seat of injury.

#### EXPERIMENT 12.

Sept. 29. Medium sized mongrel. Weight, 20 $\frac{1}{2}$  lbs. Shot with a S. & W. pistol of .22 calibre, the ball entering on a level with and to the left of the umbilicus. Laparotomy revealed a moderate amount of hæmorrhage and fecal extravasation; six perforating and one non-perforating intestinal wounds. The intestinal wounds were closed with Lembert stitches. Clots were removed, and the cavity carefully flushed and mopped out. Removed to kennel with evidences of shock. Operation lasted 1 hour.

Sept. 30. Refuses food and appears weak, lying around in a listless manner.

Oct. 1. Improving; takes a small amount of milk; gait unsteady.

Oct. 2. Appears stronger and drinks freely of milk.

Oct. 24. Recovery. Killed to obtain specimen.

Post-mortem. Seat of injury found with difficulty, showing evidence of slight circumscribed peritonitis.

#### EXPERIMENT 13.

Oct. 5. Liver colored dog. Weight, 41 lbs. Shot with a S. & W. pistol of .22 calibre; the ball entered two inches above and to left of umbilicus. Laparotomy revealed considerable hæmorrhage in the abdominal cavity, and a broad non-perforating wound of the intestine, the ball severing the serosa and muscularis. The spleen presented an oblique perforation, passing upward from the external to the internal surface. The intestinal wound was treated with five Lembert stitches. The splenic wound was closed with a continuous suture on the external surface. The inner surface was treated in a like manner, only including the omentum in the suture. This successfully arrested the hæmorrhage, but the spleen below the suture rapidly increased in size and became cyanosed in appearance. The appearance was so unfavorable that extirpation was resorted to. Splenic stump dusted with iodoform and dropped back; cavity flushed with warm sterilized water and closed; given



a hypodermic of  $\frac{1}{4}$  grain morphia and  $\frac{1}{120}$  grain atropine, together with a rectal injection of saline solution, and removed to a warm place in a condition of shock. Operation lasted nearly one hour.

Oct. 6. Walks about and takes food, apparently suffering very little, if any, inconvenience.

Oct. 7. Same.

Nov. 10. Recovered and turned over to the pound keeper, under whose care he was poisoned. In a post-mortem made by himself the bullet was found encysted in the abdominal wall.

#### EXPERIMENT 14.

Oct. 5. Full grown mongrel. Weight, 40 lbs. Shot with a S. & W. pistol of .22 calibre. The ball entered 1 inch above and to left of umbilicus. Laparotomy revealed two perforating and one non-perforating wound of intestine and a wound of the mesentery. Abdominal cavity contained only a slight amount of blood. Intestinal wounds closed with Lembert stitches. Abdominal cavity closed without flushing. Hypodermic of a  $\frac{1}{4}$  grain morphia and  $\frac{1}{150}$  grain atropine, and removed to his kennel in an excellent condition. No shock; up and walking about in less than an hour. Operation lasted a half hour.

Oct. 6. Lively. Takes milk freely.

Oct. 11. Same.

Oct. 20. Recovered, but disappeared

#### EXPERIMENT 15.

Oct. 6. Full grown dog. Weight, 38 lbs. Shot with a Remington rifle, .22 calibre, using a long shell. Ball entered on a level with the umbilicus, passing in an oblique course downward toward the right, coming out on the opposite side. The abdominal cavity was filled with blood, which principally came from a wound in the border of the spleen. The intestinal wounds found ante-mortem were seven in number, and of such size and character that it was plainly evident that the animal was beyond redemption. The splenic wound received the first attention, in the excision of a triangular piece, including the perforation, the edges being united by a running catgut suture, beginning upon the external surface and passing over the free border down the internal surface, which completely arrested the hæmorrhage. In addition there was a perforation through the mesentery, which was treated with a catgut ligature for the same purpose. The first intestinal wound measured fully an inch in length, removing more than two-thirds of the circumference of the gut, leaving only a narrow strip upon the mesenteric border. For this, complete resection was performed, reuniting the ends, after the manner of Wölfler. The next were two large wounds which were treated by a single partial resection. Beyond, some distance, were two more which received a similar treatment, and, lastly, two more very large wounds close together, which were treated by a single resection. The animal being already  $1\frac{1}{2}$  hours under operation, and in a condition of shock, no further search was made for additional injury. The clots were removed, and the cavity flushed and closed. Given  $\frac{1}{4}$  grain morphia, together with  $\frac{1}{60}$  of a grain atropine, and several hypodermics of whisky, and removed to a warm place, suffering severely from shock. Operation lasted nearly 2 hours. Fæcal extravasation and entozoa. Partly reacted, but after the lapse of three hours began to fail steadily till midnight, when death occurred, after living 6 hours.

Post-mortem, eight hours after death. Cavity contained about one and a half ounces bloody fluid; intestines distended with gas. Intestinal wounds closed and filled with plastic exudate. In addition there were two more perforations in the large intestine at the commencement of the rectum, which was filled with hardened feces, and notwithstanding this, none escaped. Splenic wound covered with exudate.

#### EXPERIMENT 16.

Oct. 12. Medium-sized dog. Weight, 22 lbs. Shot with a S. & W. pistol, .22 calibre. The ball entered to the right and above the umbilicus, passing through the abdominal cavity. Laparotomy revealed slight hæmorrhage, fecal extravasation, and entozoa. One non-penetrating and six penetrating wounds of the intestine, which were of moderate size and principally closed by the continued suture. Abdominal cavity flushed and mopped out. Cavity closed and removed with very little shock, from which he soon rallied. Time, a little over  $\frac{1}{2}$  hour.

Oct. 13. Somewhat weak but took a few ounces milk toward noon.

Oct. 14. Able to walk about and takes milk.

Acc. 31. Recovered. Killed to obtain the specimen.

Post-mortem. Abdominal wound healed with the sutures encysted. Intestines adherent and bands of lymph thrown across. Slight encroachment upon the intestinal lumen. A loop of silk was found hanging from the interior ready to be cast off. Spontaneous omental grafting occurred in another.

#### EXPERIMENT 17.

Oct. 17. Medium-sized half bull. Weight, 26 lbs. Shot with a flobert from a Remington rifle, .22 calibre. The first shot, as was shown by a laparotomy, failed to produce an injury to the abdominal viscera. The second shot produced five perforating wounds in the small intestines and three in the cæcum, together with a perforation in the mesentery. The perforating wounds were closed with Lembert stitches and the non-perforating wounds were small and left untouched. The cavity repeatedly flushed and mopped out. Given hypodermics of morphia and atropia. Closed and removed to kennel with very little evidence of shock. Operation lasted nearly an hour, during which there was extensive fecal extravasation and entozoa.

Oct. 18. Lies about in a drowsy manner, refusing food this morning, but took a few ounces of milk at noon.

Oct. 19. Refuses all food and very apathetic.

Oct. 20. Found dead.

Post-mortem. Few hours after death. Abdominal cavity contained a thick purulent fluid. Intestines matted together. Wounds of the ileocæcal region in an ulcerated condition, some of which were patulous. Death from septic peritonitis.

#### EXPERIMENT 18.

Oct. 17. Full-grown black mongrel. Weight, 35 lbs. Shot with a Remington rifle, using a .22 short. Ball entered one inch to left and below umbilicus, passing through the abdominal cavity, making its exit on the opposite side. Laparotomy revealed considerable hæmorrhage and fecal extravasation. Intestine received three large wounds together with a perforation of the spleen. The wounded intestines were drawn out of the abdominal cavity to control the fecal extravasation. Splenic

toiny was practiced for the splenic wound. The intestinal wounds were large, one requiring a triangular excision. The others were closed with Lembert stitches. Cavity was repeatedly flushed, mopped out and closed. Removed in a condition of shock to a warm place. Operation lasted 1 hour.

Oct. 18. Drank a few ounces milk in the morning, which he soon vomited. Later in the day he refused all food and appears drowsy.

Oct. 19. Refuses food and appears apathetic.

Oct. 20. Very weak. Refuses food, and appears apathetic. Temperature,  $102.2^{\circ}$ .

Oct. 21. Temperature,  $103\frac{2}{3}^{\circ}$ ; otherwise the same. Died late this afternoon.

Post-mortem. Soon after death. Abdominal wound upon pressure discharged a few drops of pus. Abdominal cavity contained about six ounces of red-lish yellow pus. Splenic stump adherent to omentum forming a pocket for the accumulation of pus. Intestinal wounds in contact but upon pressure allowed the escape of the contents. Died of septic peritonitis.

*Note.*—This as well as the one used in the previous experiment was obtained from the dog pound which really is nothing more than a fertilizing works where they are fed upon the bodies of dead animals. From the amount and condition of the contents I believe insutilation would have unquestionably very much increased the quantity of extravasation in both of these.

#### EXPERIMENT 19.

Oct. 18. Full-grown half bull. Weight, 40 lbs. Shot with a S. & W. pistol, .22 calibre. Senn's test was employed and indicated the absence of a perforation of the gastro-intestinal tract. This was corroborated by a laparotomy which revealed a slight hæmorrhage and a non-penetrating wound. The cavity was flushed, mopped out and closed. The intestines remained distended throughout the operation, and were returned with difficulty. In applying the test the wound of entrance was so small that it was only rendered patulous after mutilation. There was no shock, and the animal made an uninterrupted recovery. Soon after recovery he made his escape from the hospital.

#### EXPERIMENT 20.

Oct. 18. Full-grown black bitch. Weight, 50 lbs. Shot with a S. & W. pistol, .22 calibre. Laparotomy revealed the cavity filled with blood. Intestines received three small perforating wounds and a contusion. The animal, which was found to be pregnant with six pups, also received three perforating wounds of the uterus and tubes. The intestinal wounds were closed with Lembert stitches. The pregnant tubes and uterus were ligated in sections and cut away. The cavity was flushed, mopped out, and closed. Given a hypodermic of morphia and whisky and removed. No fæcal extravasation. Operation lasted  $1\frac{1}{4}$  hours.

Oct. 19. Appears lively, and drinks freely of milk.

Oct. 20. Same.

Oct. 21. Made his escape but was again found Oct. 26 in a recovered condition.

#### EXPERIMENT 21.

Oct. 29. Medium-sized brindle bull. Weight, 28 lbs. Shot with a S. & W. pistol, .22 calibre. Ball entered one and a half inch above and to the right of the umbilicus. Laparotomy revealed considerable hæmorrhage and fæcal extravasation. Five perforating wounds of the intestines and a wound of the spleen. Splenectomy

was practiced for the wound of the spleen, ligating its root in three portions. Intestinal wounds closed with Lembert stitches. Cavity flushed with warm sterilized water and closed. Given a hypodermic of whisky and morphia and removed in a good condition. Operation lasted 1 hour.

Oct. 30. Died at noon, living only 18 hours after the operation.

Post-mortem. Abdominal cavity contained about a pint of bloody fluid and clots. Intestinal wounds sealed and in good condition.

#### EXPERIMENT 22.

Oct. 29. Full-grown black spitz. Weight, 30 lbs. Shot with a S. & W. pistol, .22 calibre. Ball entered two inches to the right and above umbilicus. Laparotomy revealed slight hæmorrhage, five perforating and two non-perforating intestinal wounds. A wound of the mesentery. The perforating wounds were closed with Lembert stitches. The others were left untouched. Cavity flushed with warm sterilized water, mopped out and closed. Given a half grain morphia and two hypodermics of whisky. Slight fecal extravasation. Operation lasted 1 hour. In this case Senn's test was attempted, but it was impossible to force the gas beyond the fecal accumulation. The bag was a five gallon one, and well filled, and such compression used as almost to cause a rupture. Also the exchange of different tubes was practiced but without success.

Oct. 30. Very weak. Refuses food.

Oct. 31. Improved. Took several ounces milk.

Nov. 2. Appears lively and takes food freely.

Nov. 4. Same.

Nov. 8. Recovered, but made his escape from the hospital.

#### EXPERIMENT 23.

Nov. 2. Medium-sized white dog. Weight, 21 lbs. Shot with a S. & W. pistol, .22 calibre. Ball entered obliquely to left of umbilicus. Laparotomy revealed considerable hæmorrhage, six intestinal, one mesenteric and a wound of the spleen. The mesenteric wound was treated with a ligature to arrest the hæmorrhage. The intestinal wounds were closed with Lembert stitches and splenectomy practiced for the wound of the spleen. Cavity flushed, mopped out and closed. Fæcal extravasation. Operation lasted 1 hour. In this experiment Senn's test was used with the same difficulty and result as in the preceding. The rectum being completely filled with fecal matter in a soft condition.

Nov. 3. Took a few ounces of milk in the morning but died at noon. Seemed very much annoyed with tenesmus.

Post-mortem. Three hours after death. Abdominal cavity contained a few ounces of bloody fluid. Small intestines alternately contracted. Large intestines completely filled with fecal matter. Intestinal wounds in fair condition. In addition to those closed, another was found that had passed unobserved. Died of an acute septic intoxication.

#### EXPERIMENT 24.

Nov. 2. Mongrel. Weight, 32 lbs. Shot with a S. & W. pistol, .22 calibre. Ball entering two inches to the right and on a level with the umbilicus ranging obliquely upward. Laparotomy revealed slight hæmorrhage a broad non-perforating

wound of the intestine and a wound of the mesocolon involving a large vessel. The vessel was ligated and the intestinal wound treated with Lembert stitches, which arrested the hæmorrhage from its edges. The cavity was flushed, mopped out, and closed. Given an injection of morphia and atropia, and removed in an excellent condition. Operation lasted  $\frac{1}{2}$  hour.

Nov. 3. Lively, and takes food freely. Will again be referred to in another experiment.

#### EXPERIMENT 25.

Nov. 5. Full-grown dog. Weight, 49 lbs. Shot with a S. & W. pistol, .22 calibre. The ball entered to the right and above umbilicus, passing in a slanting manner downward toward the flanks. Cavity filled with blood. No intestinal wound. The spleen was of a very large size and lying in front of the intestines protected them from injury. The external surface of spleen received a grazing wound for which splenectomy was performed. The splenic root was ligated with a double ligature, but additional ligatures were required to arrest the hæmorrhage. Cavity was flushed, mopped out and closed. Given fifteen minims Magendie's solution and whisky hypodermically and in a condition of shock removed to a warm place. Operation lasted 1 hour. Reaction very slowly ensued.

Nov. 6. Drank a few ounces milk, but very weak.

Nov. 7. Found dead this morning.

Post-mortem. Abdominal cavity contained about a pint of bloody fluid and clots. Ligatures apparently intact. Splenic stump covered with clots.

Death from recurring hæmorrhage.

#### EXPERIMENT 26.

Nov. 12. Full grown mongrel. Weight, 44 lbs. Shot with a S. & W. pistol, .22 calibre. Ball entered to the right and below the umbilicus, passing obliquely downward. Laparotomy revealed considerable hæmorrhage and fæcal extravasation, four perforating wounds of the intestines and a grazing wound of the spleen. Intestinal wounds closed with Lembert stitches. Splenic wound treated with a running suture; clots removed, cavity flushed, mopped out, and closed. Given fifteen minims Magendie's solution and whisky hypodermically, and removed, in a condition of shock, to a warm place, and external heat applied. Operation lasted nearly 1 hour. Reaction in 2 hours.

Nov. 13. Refuses food, and lies in a quiet manner with retracted belly and an occasional groan. Temperature,  $101^{\circ}$ , respiration 20. Given twenty minims Magendie's solution.

Nov. 14. Died this morning.

Post-mortem, several hours after death. Cavity contained about a half pint of bloody fluid. Intestines distended with gas and adherent. Intestinal wounds all sealed, excepting one which allowed the escape of fæces; splenic wound covered with lymph. The mesocolon contained a large rent which involved several small vessels. The dog was very old, which accounted for the ease with which the tissues tore. Death from an acute septic peritonitis.

#### EXPERIMENT 27.

Nov. 12. Full grown black dog. Weight, 41 lbs. Shot with a S. & W. pistol,

.22 calibre. Ball entered below and to the right of umbilicus. Laparotomy revealed the ball lodged immediately under the peritoneum, having failed to enter the peritoneal cavity. Shot a second time, the ball entering at about the same place. Cavity soon filled with blood, which was found to come from a mesenteric artery. The vessel ligated and the examination continued. Eight perforations were found in the intestines. Intestinal wounds closed with Lembert sutures. Cavity flooded and mopped out. The operation lasted nearly 1 hour. Extravasation of liquid faeces occurred. Given ten minims of Magendie's solution and whisky, hypodermically, and removed in an excellent condition.

Nov. 13. Lively and took several ounces of milk.

Nov. 14. Same.

Nov. 22. Continued in good condition up to his escape from the hospital. Recovered.

#### EXPERIMENT 28.

Nov. 16. Full grown black mongrel. Weight, 40 lbs. Shot with a S. & W. pistol, .22 calibre. Ball entered on a level with and to the left of umbilicus. Laparotomy revealed considerable hæmorrhage, eight perforating intestinal wounds, two of which involved the mesenteric border, a wound of the spleen and one of the mesentery, involving a vessel. The mesenteric wound was treated with a ligature. Wound of the spleen closed by a running suture upon both sides. Lembert sutures were used to close the intestinal wounds, excepting those on the mesenteric edge, which were closed by the continued suture, drawing up a loose fold of the mesentery near the intestinal border to assist in the closure. Cavity flushed and closed. Given ten minims of Magendie's solution and whisky, hypodermically. Removed to the kennel in a good condition. Operation lasted 1 hour.

Nov. 17. Refuses food and lays about in a drowsy manner. Evening temperature, 101.5°.

Nov. 18. Same.

Nov. 19. Temperature, 102°; still refusing food and indifferent to everything. Late in the evening, the dog in a very much depressed condition was again placed upon the table, and after stimulation with whisky and digitalis, again opened. The cavity contained about a half pint of purulent fluid, which was carefully mopped out; intestines highly inflamed and fragile. Several small non-perforating rents near the mesenteric border had ulcerated through. These were closed by the Czerny Lembert suture; the cavity flushed with a hot 1:10000 solution of bichloride, and mopped out. This was repeated with hot sterilized water, and again mopped out and closed. Operation lasted 1 hour.

Nov. 20. Found dead.

Post-mortem. Abdominal cavity contained about three ounces of purulent fluid. Intestines matted together with adherent omentum. Spleen marked with a dark spot beneath the suture. In the left hypochondriac region was found a small sponge, enclosed in a pocket formed by the adherent intestines and omentum which was overlooked in the first operation. The end was largely determined by the cold room during the night. Death from septic peritonitis.

#### EXPERIMENT 29.

Nov. 23. Medium sized mongrel. Weight, 36 lbs. Shot with a S. & W. pistol, .22 calibre. Ball entered one inch below and three inches to the left of umbilicus.

Laparotomy revealed a moderate amount of hæmorrhage, two perforating wounds of the uterus, and one of a ligament of the uterus, seven perforating intestinal wounds and one of the spleen. The uterine wounds were closed with a continuous suture. The splenic wound was sewed upon both sides with the continued stitch. The intestinal wounds were close together and were all removed in a resection of 12 inches, the ends being united after the manner of Wölfler. The site of the resection was reinforced by an omental graft, cavity flushed, mopped out and closed. Fæcal extravasation occurred. Operation lasted 1½ hours, and when completed the dog was suffering severely from shock. Given ten minims of Magendie's solution and whisky hypodermically, and removed to a warm place and external heat applied. Reaction followed in about 2 hours.

Nov. 24. Refuses food, but appears lively otherwise.

Nov. 25. Improving; took several ounces milk.

Nov. 26. Improving; fed upon milk and finely chopped meat.

Nov. 27. Refuses food and appears drowsy, vomiting at intervals; takes water freely, which he soon vomits. After stimulation abdominal section was again performed. The resection was again brought to view, and found to be in an obstructed condition from an enterolith. The proximal end of the united gut was very much distended, and the gut in the vicinity in an inflamed condition. The pressure within being sufficient to cause partial separation, another resection of six inches was performed, the cavity washed out and closed. Given whisky hypodermically and removed to a warm place in a condition of shock, from which he died. Like in the other, the end was largely determined by the cold room.

Post-mortem. Cavity clean, and resection unchanged.

#### EXPERIMENT 30.

Nov. 23. Very large black mongrel. Weight, 60 lbs. Shot with a S. & W. pistol, .32 calibre. Laparotomy revealed a slight hæmorrhage and three large perforating intestinal wounds, which were closed with Lembert stitches. Cavity mopped out and closed. No fæcal extravasation. Operation lasted nearly an hour. Given five minims of Magendie's solution and two hypodermics of whisky, and removed in an excellent condition. Reaction prompt.

Nov. 24. Appears sleepy. Vomited a half pint greenish fluid. Refused milk.

Nov. 25. Very much improved. Eats well and appears lively.

Nov. 26. As lively as before the operation.

Nov. 27. Same.

Dec. 14. Recovered. Killed to obtain specimen.

Post-mortem. An extensive peritonitis had occurred with adhesions to the omentum and the neighboring coils.

#### EXPERIMENT 31.

Nov. 23. English bulldog. Weight, 34 lbs. Shot with a S. & W. pistol, .22 calibre. Ball entered one inch to the left and below the umbilicus. Laparotomy revealed considerable hæmorrhage, nine perforating wounds of intestine and a wound of spleen. Several of the intestinal wounds were on the mesenteric border, and closed with a continuous suture. The remaining wounds were closed with Lembert stitches. Splenic wound closed on both sides with a continuous suture. Cavity sponged out, flushed and closed. Operation lasted over an hour. Extravasation of

liquid feces. Hypodermic of Magendie's solution and whisky, and removed to a warm place in a condition of shock. Reaction occurred in 2 hours.

Nov. 24. Very weak and refuses food.

Nov. 25. Took several ounces milk.

Nov. 26. Improving. Fed upon meat and milk.

Dec. 9. Same.

Dec. 19. Recovered and reclaimed.

#### EXPERIMENT 32.

Nov. 23. Full grown black mongrel. Weight, 40 lbs. Shot with a S. & W. pistol, .22 calibre. Ball entered three inches below and to the left of umbilicus. Laparotomy revealed six perforating and two non-perforating intestinal wounds, two wounds of the mesentery involving mesenteric vessels. The vessels were ligated in the mesenteric wounds and the perforating intestinal wounds closed with Lembert stitches. The non-perforating wounds were left untouched. Cavity was flushed and closed. Operation lasted about 1 hour. Fæcal extravasation. Given ten minims Magendie's solution and whisky hypodermically, and removed to a warm place.

Nov. 24. Very weak and refuses food.

Nov. 25. Gait unsteady, took a few ounces milk.

Nov. 26. Refuses food and appears listless.

Nov. 27. Very weak and refuses food. Appears suffering from septic poisoning. Stiches were cut, which allowed the wound to gap, and the escape of thick creamy pus.

Nov. 28. Very weak and emaciated. Refused milk but took some finely chopped meat.

Nov. 29. Improving; takes meat.

Nov. 30. Same.

Dec. 2. Lively and eats well.

Dec. 14. Perfect recovery. Killed to obtain specimen.

Post-mortem. The abdominal wound closed by granulation partly, and partly by the coils of intestines, which were covered externally by a layer of granulation tissue leaving in the abdominal wall a broad and depressed scar. The intestines were firmly and closely bound together, and to the abdominal parietes.

#### EXPERIMENTS UPON GUNSHOT WOUNDS WITHOUT OPERATIVE INTERFERENCE.

#### EXPERIMENT 33.

Sept. 30. Medium-sized English bull. Weight, 30 lbs. Shot with a S. & W. pistol, .22 calibre. Given ten minims Magendie's solution and allowed to come from under the anæsthetic.

Oct. 1. Refuses food and lies huddled together as if too weak to stand.

Oct. 2. Found dead some distance from his house.

Post-mortem. Abdominal cavity contained a small amount of thick fluid. Intestines matted together with the omentum adherent. There were two perforating wounds in the small and two in the large intestines, each of which were discharging a thick yellowish-red creamy fluid. In addition there were two more perforating wounds of the intestines. Death from septic peritonitis.



EXPERIMENT 34.

Oct. 20. Medium-sized mongrel. Weight, 31 lbs. Shot with a Remington rifle, using a .22 short shell. Ball entered on a level with, and one and a half inches to the right of the umbilicus. Dog was allowed to come from under the anæsthetic and remain so for an hour. Again placed under the anæsthetic and Senn's test applied. Gas soon made its appearance at the wound of entrance and burned in a jet. Animal again returned to the kennel.

Oct. 21. Found dead.

Post-mortem. Abdominal cavity contained about eight ounces of bloody fluid and a large number of clots. Considerable extravasation of feces and entozoa. Five large wounds of the intestines and one of the mesentery involving a vessel. Wound of the splenic border. Death from hæmorrhage.

EXPERIMENT 35.

Oct. 20. Medium-sized mongrel. Weight, 20 lbs. Shot with a flobert from a Remington rifle. Ball entered on a level with and two inches below the umbilicus. Senn's test was applied indicating an intestinal perforation. The gas did not burn in a jet but only now and then the bubbles ignited. Removed, but died in an hour's time.

Post-mortem. Abdominal cavity filled with bloody fluid and clots. There were seven perforating wounds of the intestine and four of the mesentery. Two of the latter involved mesenteric vessels. Death from hæmorrhage.

EXPERIMENT 36.

Nov. 5. Medium-sized mongrel. Weight, 20 lbs. Shot with a S. & W. pistol, .22 calibre. Ball entered on a level with and to the right of the umbilicus, passing in a very shallow course. Given 12 minims Magendie's solution and removed. No shock, the dog rallying at once.

Nov. 6. Up and takes milk.

Nov. 7. Lively and eats freely.

Nov. 8. Same.

Nov. 12. Apparently recovered and made his escape from the hospital. In this experiment the ball apparently did not enter the abdominal cavity, or if it did so, it failed to create any serious damage.

EXPERIMENT 37.

Nov. 12. Small mongrel. Weight, 17 lbs. Shot with a S. & W. pistol, .22 calibre. Given 15 minims Magendie's solution and removed.

Nov. 13. Found dead.

Post-mortem. Cavity contained some blood and nine perforating wounds of the intestines. Death from shock.

EXPERIMENTS UPON SEPARATE ORGANS—RESECTIONS.

EXPERIMENT 38.

Aug. 28. Full-grown bull dog. Weight, 34 lbs. Abdominal cavity opened and a loop of intestine withdrawn. The vessels at the mesenteric border ligated and one

inch resected. The ends were united after the method of Wölfler (uniting the posterior third from within). Uneventful recovery followed.

#### EXPERIMENT 39.

Aug. 31. Small mongrel. Weight, 14 lbs. Abdominal cavity opened and a loop of intestine withdrawn, resecting four inches as in the previous experiment. Recovery.

#### EXPERIMENT 40.

Oct. 2. Same dog used that served in the foregoing experiment. Abdomen opened just above the scar from the former operation. The resection was found in a perfect condition with a spontaneous omental graft at the seat of union. The sutures all encysted excepting those introduced posteriorly. Eighteen inches including the former resection were now removed. The vessels were ligated at the vertebral border of the mesentery and a V-shaped piece excised uniting the edges with a running catgut suture. The intestines were united as in the preceding experiments only reinforcing the resection by an "omental graft." The ends were united not far from the ileocaecal valve, and the blood supply very much interfered with; however no harm resulted. Recovery followed without any inconvenience to the animal after the removal of 22 inches of intestine.

Nov. 28. Killed to obtain the specimen.

Post-mortem. Several adhesions at the seat of resection. No narrowing of the calibre. Sutures encysted. The web of the mesentery between the vessels at the resection absent.

#### EXPERIMENT 41.

Oct. 12. The same subject that served in Experiment 38 was used here. Abdomen opened and the site of the former resection withdrawn and found marked by an omental adhesion and a slight narrowing of the intestine internally and externally. The sutures all encysted and plainly visible. Four inches were resected including the site of the former operation. Very shortly after the operation the dog by mistake was fed upon a large piece of meat, but no harm resulted.

Nov. 5. Killed to obtain the specimen.

Post-Mortem. Omentum adherent. Lumen slightly narrowed. Sutures encysted.

#### EXPERIMENT 42.

Nov. 19. In this experiment the same dog was used that served in Experiment 24. Laparotomy above the former site. The spleen withdrawn and a triangle excised measuring one inch at its base and a fraction more from base to apex. The edges were united by a continuous suture commencing on its external surface, passing over the free border and down upon its internal surface. This completely arrested the hæmorrhage. Following this the spleen increased to almost double its size and became cyanosed in appearance, in which state it was returned and the cavity closed.

Dec. 28. Recovered. Killed to obtain specimen. Complete union marked by a white line which represented the united edges. Omentum adherent. Sutures encysted and somewhat softened. Part below the suture slightly atrophied and darker color, but otherwise unchanged.

EXPERIMENT 43.

Jan. 2. Full-grown mongrel. Weight, 40 lbs. Curvilinear incision under the right border of the ribs, and afterward joined by one in the linea alba. Liver exposed and perforated by a blunt aseptic instrument as well as the excision of a narrow but long triangle. The puncture was sewed upon both sides which arrested the hæmorrhage completely. The excision was united by a running cat-gut suture applied as in the previous experiment, which likewise arrested the flow from the surfaces. In drawing the liver into view rupture of its capsule occurred in several places. Cavity washed out and closed.

Jan. 3. Walking about. Took several ounces of milk in the morning but refused food at noon and evening. Urine loaded with bile.

Feb. 18. Killed to obtain specimen.

Post-mortem. Liver marked by white lines at the points of rupture. Slight scars at the punctures. The excision was marked by an omental adhesion but otherwise unchanged. No evidence of peritonitis.

EXPERIMENT 44.

Jan. 2. Small white mongrel. Weight, 19 lbs. A hypodermic syringe of bile was obtained from another dog and injected into the peritoneal cavity without the introduction of air. This was repeated a second time and each time followed by an exhibition of pain from the dog. The syringe was cautiously introduced, care being observed to try and insure the arrival of the bile in the peritoneal cavity, and from the impression it was apparently successful.

Jan. 3. Refuses all food and lies quiet in one place.

Jan. 4. Same.

Jan. 15. Recovered, and killed for further examination.

Post-mortem. Absolutely no signs were visible of any change having occurred within the peritoneal cavity.

EXPERIMENT 45.

Jan. 29. Liver-colored mongrel. Weight, 32 lbs. Abdomen opened and the intestines exposed. The intestines were insufflated with air until they were distended. The respirations became short and slow. Puncture was made into the large intestine, which was followed by an escape of air and the collapse of the intestine, but only for a short distance beyond. This was repeated in the small intestines with the same result. The stomach, which was likewise distended, was compressed, but no gas escaped till a puncture was made into it. The intestines were largely distended, and the occurrence of acute flexures prevented the ready escape of the air.



## RÉSUMÉ.

The following represents a résumé of the whole.

The experiments were divided into three classes. Experiments upon gunshot wounds with interference, experiments upon gunshot wounds without interference, and experiments upon separate organs.

Of the thirty-two experiments represented in the first class, seventeen ended in recovery and, omitting the second experiment, in which death followed almost immediately, the mortality amounts to 45.1 %.

In all except four of the recognized fourteen that ended fatally death occurred either at the end of or during the first twenty-four hours following the operation.

In the excepted four the deaths occurred in one and a half, three, three and a half and four and a half days respectively after the operation. The mortality of the whole being dependent upon, two from hæmorrhage, 14.2 %; five from shock primarily, 35.7 %; six from sepsis, 42.8 % (and one from shock consecutive to an operation for obstruction).

Although the end in view was not that of securing recoveries, but rather that of an inquiry into the treatment of these injuries, yet with different subjects and better surroundings it might also have been different.

The second class consisted of five that were shot and allowed to go without operative interference. Of these one recovered, one died of shock, two of hæmorrhage, and one of sepsis. In the one that escaped there is a strong probability that very slight if any injury occurred.

The third class consists of four resections after Wölfler's method, a partial resection of the liver, a partial resection of the spleen and one experiment upon the peritoneum, all ending in recovery. Lastly a final experiment with Senn's test.

Resulting from the foregoing paper, I beg leave to submit for further consideration, the following deductions:

1. In view of the uncertainty which attends these injuries exploratory laparotomy should in every case be boldly but carefully performed. The operator being in readiness to meet

any indication that the exigency of the case may demand.

2. Laparotomy in the linea alba is preferable to one performed in the course of the ball unless there are reasons to believe that the ball became arrested short of the peritoneum or its track infected, in which case incision and drainage should be employed.

3. Considering the objections against Senn's test as a diagnostic means of determining the necessity of a laparotomy the possible harm outweighs to such an extent the possible benefit that its general adoption is hardly justifiable.

4. The value of Senn's method in determining at the close of the operation the security of the intestinal tract is questionable, and still *sub judice*.

5. Large intestinal wounds not involving the mesenteric border are best treated by partial resections.

6. Intestinal wounds upon the mesenteric border unless very small require a complete resection.

7. Where several large wounds are situated very close together a single resection including them all should be considered.

8. Partial resections of the liver, spleen or pancreas are feasible steps and may be required.

9. Suturing of both openings in wounds of the liver and spleen for the arrest of hæmorrhage is advisable.

10. Excepting superficial lesions nephrectomy is the only procedure in wounds of the kidney.

11. Should obscure symptoms arise pointing to an early peritonitis the use of salines are indicated.

12. If suppurative peritonitis is established, early exploratory incision, drainage and disinfection of the peritoneum should be undertaken.

## EDITORIAL ARTICLES.

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### I.—THE ACTION OF CHLOROFORM IN THE PRODUCTION OF ANÆSTHESIA, AS DEMONSTRATED BY THE SECOND HYDERABAD COMMISSION.<sup>1</sup>

### II.—NOTES ON THE REPORT OF THE SECOND HYDERABAD CHLOROFORM COMMISSION.<sup>2</sup>

Believing from his own experience and from the teaching of the late Prof. Syme that chloroform might be administered with perfect safety, provided the administrator watched the respiration with sufficient care, Surgeon-Major Lawrie, of Hyderabad, secured the appointment of a commission by the Nizam's government to demonstrate the truth of this doctrine by laboratory experiments as well as by clinical observation. The conclusions of this committee being questioned by many authorities, and in particular by the *Lancet*, to whom they seemed insufficient to overthrow the conclusions of many other observers whose researches went to prove that one of the dangers of chloroform was from paralysis of the heart, Dr. Lawrie applied to the Nizam for the appointment of a second commission, which should contain a member nominated by the *Lancet*. That journal thereupon named Dr. Lauder Brunton, than whom no person could be better qualified for such an investigation, and whose views were at that time at variance with those of the commission.

The experiments were of two kinds: (1) those being made without recording apparatus, with a view to ascertaining the influence exerted

<sup>1</sup>Report of the Second Hyderabad Chloroform Commission [consisting of Surgeon-Major Edward Lawrie and Drs. G. Bombard and Rustomji D. Hakim, of Hyderabad, and Dr. T. Lauder Brunton of London].—*The Lancet*, Jan. 18, 1890.

<sup>2</sup>By Alexander Wilson, M.R.C.S., Administrator of Anæsthetics, Royal Infirmary, Manchester.—*The Medical Chronicle* (Manchester), April, 1890.

by various conditions on the relations between stoppage of the heart and of respiration and the limits within which artificial respiration and other means of resuscitation are useful. (2) Those with recording apparatus, made to ascertain the effect of various conditions upon heart and blood pressure.

Four hundred and thirty experiments were made upon dogs, monkeys, goats and horses, and the conditions were varied in every way that suggested itself. The anæsthetic was administered in large and in small quantities, with inhalers and without them, even by forcing it into the trachea with bellows. Subjects were held in perpendicular and horizontal positions and in glass and wooden boxes. The conditions were modified by hypodermic injections of morphia, strychnine, cocaine and atropine, alone and in combination; in other cases the heart and other organs had been rendered fatty by a course of phosphorus, and in still other cases the subjects were affected with cardiac disease. The condition of the digestive apparatus was also varied, some of the subjects having been deprived of food for some time, and others having partaken of starchy or fatty food or of meat; the administration of Liebig's extract, coffee and ammonia previous to giving the chloroform also modified the conditions in certain cases.

The commission premised that its objects were five in number, viz.:

I. To test the suitability and safety of chloroform as an anæsthetic. Experiments with ether and the A. C. E. mixture were instituted principally for the sake of comparison with chloroform on certain points, and it is not pretended that they afford a complete exposition of the action of those agents on the system.

II. The effect of pushing the above named anæsthetics (*a*) to a dangerous degree, and more especially until the respiration ceases; (*b*) until death results.

III. The modifications in the effects of these anæsthetics which result from (*a*) asphyxia in varying degrees and produced by various means, (*b*) from the use of drugs such as morphine, atropine, physostigmine, and others.

IV. The reality or otherwise of the alleged liability during ordinary chloroform administration to the occurrence of primary or secondary



syncope or stoppage of the heart, brought about either by shock or through fatty or weak heart, or by hæmorrhage, or by changes in the position of the body.

V. The effect of the anæsthetics above mentioned upon different animals, more especially upon monkeys, as the nearest approach to human beings.

These experiments proved to the satisfaction of the commission that chloroform, when given continuously by any means which insures its free dilution with air, causes a *gradual* fall in the mean blood-pressure, provided the animal's respiration is not impeded in any way, and it continues to breathe quietly without struggling or involuntary holding of the breath. Struggling, independently of any change in the respiratory rhythm, appears generally to raise the blood-pressure. But when struggling is accompanied, as it often is, by acceleration of the respiration and pulse, especially if the respiration is deep and gasping, it leads to a more rapid inhalation of chloroform, and consequently to a more rapid fall of blood-pressure and a greater after-fall.

The theory which has hitherto been accepted, that the danger in chloroform administration consists in the slowing or stoppage of the heart by vagus inhibition, is now shown to be absolutely incorrect. There is no doubt whatever that the controlling influence of the vagus on the heart is a safeguard, and that it is the exhaustion of the nerve which is dangerous.

Complete stoppage of the respiration always means that an overdose has been administered. The overdose may have been so great as to produce a very prolonged after-fall of blood-pressure, and may thus render restoration impossible.

In the course of the experiments of the committee various drugs were administered in order to ascertain if they had any effect in modifying the action of chloroform. The result showed that none of them had any effect in preventing the typical descent of the blood-pressure that occurs when chloroform is inhaled. Atropine, when given in a dose sufficient to paralyze the vagi, of course prevents the action of those nerves in asphyxia, and by increasing the action of the heart it appears to cause a more rapid descent in the blood-pressure when

chloroform is inhaled, as has been already explained. Morphine appeared to render the rise in blood-pressure that occurred when the chloroform was discontinued slower and less complete, and to bring about a more or less permanent condition of anæsthesia.

The other drugs used had no effect upon the action of chloroform, except when their own special action became the leading feature in the case—as, for instance, during vomiting from apomorphine or convulsions produced by nicotine.

In order to test the alleged danger from shock during chloroform administration, the committee performed a very large number of those operations which are reputed to be particularly dangerous in this connection—such as extractions of teeth, evulsion of nails, section of the muscles of the eye, snipping of the skin of the anus, etc. In many cases the operation was performed when the animal was merely stupefied by the chloroform and not fully insensible. In such cases a slight variation in the blood-pressure would sometimes occur, such as one would expect from the irritation of a sensory nerve or from the struggling that ensued, but in no case in any stage of anæsthesia was there anything even suggestive of syncope or failure of the heart's action. In thrusting a needle into the heart, there was often a momentary but well-marked fall of blood-pressure; but even this was absent in all other injuries. If chloroform really had any power to increase the tendency to shock in operations, it is impossible to believe that it would not have been manifested, to some degree at least, in one or other of these numerous experiments. The commission was, however, not content with this negative result, and determined to ascertain the effect of direct irritation of the vagi during continued chloroform administration. The result of such experiments proved that inhibition of the heart's action prevented, rather than assisted, the fatal effects of prolonged chloroform inhalation.

The conclusion of the committee was that chloroform has no power of increasing the tendency to either shock or syncope during operations. If shock or syncope from any cause does occur, it prevents, rather than aggravates, the dangers of chloroform inhalation.

The experiments on dogs that had been dosed with phosphorus for

a few days previously, showed that the fatty and consequently feeble condition of the heart and other organs so produced has no effect in modifying the action of chloroform.

The truth about the fatty heart appears to be that chloroform *per se* in no way endangers such a heart, but on the contrary, by lowering the blood-pressure, lessens the work that the heart has to perform, which is a positive advantage. But the mere inhalation of chloroform is only a part of the process of the administration in practice. A patient with an extremely fatty heart may die from the mere exertion of getting upon the operating-table, just as he may die in mounting the steps in front of his own hall-door, or from fright at the mere idea of having chloroform or of undergoing an operation, or during his involuntary struggles. Such patients must inevitably die occasionally during chloroform administration, and would do so even were attar of roses or any other harmless vapor substituted for chloroform.

The effect of hæmorrhage was tested by opening the femoral artery and allowing a considerable quantity of blood (eight to twelve ounces) to escape. An immediate lowering of the blood-pressure results, and this is very slowly recovered from. Such an accident, however dangerous it may be in itself, in no way affects the action of chloroform, except in so far that a patient who has been nearly bled to death would require less chloroform in his system to put him into a state of anæsthesia. The low condition of his blood-pressure produced by the hæmorrhage would tend to prevent the too rapid intake of chloroform.

Inversion of the body failed to restore an animal that was in the last stage of chloroform poisoning, though it raised the blood-pressure in the carotid artery as long as it was continued. This change in the pressure of blood of the carotid appeared therefore to be due simply to gravity.

In the experiments with ether it was found impossible to produce efficient anæsthesia unless some form of inhaler was used which would thoroughly exclude the air. As soon as the air is rigidly excluded, the blood-pressure commences to fall gradually, exactly in the same way as with chloroform, and with the same succession of phenomena, viz., first anæsthesia, then cessation of respiration, then of the heart move-

ments, and finally death. An exactly similar succession of events can be brought about by making an animal inhale carbonic acid gas alone.

The A. C. E. mixture given gently with plenty of air and the other conditions mentioned before under chloroform produces the typical chloroform trace.

In the cases of accidental deaths that occurred during the experiments, the fatal result was brought about either by neglecting to watch the condition of the respiration during or after the administration of chloroform, especially while the carotid artery was being exposed, or from a reckless administration of chloroform in the endeavor to check or prevent struggles.

PRACTICAL CONCLUSIONS.---The following are the practical conclusions which the commission think may fairly be deduced from the experiments recorded in this report.

I. The recumbent position on the back and absolute freedom of respiration are essential.

II. If during an operation the recumbent position on the back cannot, from any cause, be maintained during chloroform administration, the utmost attention to the respiration is necessary to prevent asphyxia or an overdose. If there is any doubt whatever about the state of respiration the patient should be at once restored to the recumbent position on the back.

III. To insure absolute freedom of respiration, tight clothing of every kind, either on the neck, chest or abdomen, is to be strictly avoided; and no assistants or bystanders should be allowed to exert pressure on any part of the patient's thorax or abdomen, even though the patient be struggling violently. If struggling does occur, it is always possible to hold the patient down by pressure on the shoulders, pelvis or legs, without doing anything which can by any possibility interfere with the free movements of respiration.

IV. An apparatus is not essential, and ought not to be used, as, being made to fit the face, it must tend to produce a certain amount of asphyxia. Moreover, it is apt to take up part of the attention which is required elsewhere. In short, no matter how it is made, it introduces

an element of danger into the administration. A convenient form of inhaler is an open cone or cap with a little absorbent cotton inside at the apex.

V. At the commencement of inhalation care should be taken, by not holding the cap too close over the mouth and nose, to avoid exciting, struggling, or holding the breath. If struggling or holding the breath do occur, great care is necessary to avoid an overdose during the deep inspirations which follow. When quiet breathing is insured as the patient begins to go over, there is no reason why the inhaler should not be applied close to the face; and all that is then necessary is to watch the cornea and to see that the respiration is not interfered with.

VI. In children, crying insures free admission of chloroform into the lungs; but as struggling and holding the breath can hardly be avoided, and one or two whiffs of chloroform may be sufficient to produce complete insensibility, they should always be allowed to inhale a little fresh air during the first deep inspirations which follow. In any struggling persons, but especially in children, it is essential to remove the inhaler after the first or second deep inspiration, as enough chloroform may have been inhaled to produce deep anæsthesia, and this may only appear, or may deepen, after the chloroform is stopped. Struggling is best avoided in adults by making them blow out hard after each inspiration during the inhalation.

VII. The patient is, as a rule, anæsthetized and ready for the operation to be commenced when unconscious winking is no longer produced by touching the surface of the eye with the tip of the finger. The anæsthetic should never under any circumstances be pushed till the respiration stops; but when once the cornea is insensitive, the patient should be kept gently under by occasional inhalations, and not allowed to come out and renew the stage of struggling and resistance.

VIII. As a rule, no operation should be commenced until the patient is fully under the influence of the anæsthetic, so as to avoid all chance of death from surgical shock or fright.

IX. The administrator should be guided as to the effect entirely by the respiration. His only object, while producing anæsthesia, is to see that the respiration is not interfered with.

X. If possible, the patient's chest and abdomen should be exposed during chloroform inhalation, so that the respiratory movements can be seen by the administrator. If anything interferes with the respiration in any way, however slightly, even if this occurs at the very commencement of the administration, if breath is held, or if there is ster-tor, the inhalation should be stopped until the breathing is natural again. This may sometimes create delay and inconvenience with inexperienced administrators, but experience will make any administrator so familiar with the respiratory functions under chloroform that he will in a short time know almost by intuition whether anything is going wrong, and be able to put it right without delay before any danger arises.

XI. If the breathing becomes embarrassed, the lower jaw should be pulled, or pushed from behind the angles, forward, so that the lower teeth protrude in front of the upper. This raises the epiglottis and frees the larynx. At the same time it is well to assist the respiration artificially until the embarrassment passes off.

XII. If by any accident the respiration stops, artificial respiration should be commenced at once, while an assistant lowers the head and draws forward the tongue with catch-forceps, by Howard's method, assisted by compression and relaxation of the thoracic walls. Artificial respiration should be continued until there is no doubt whatever that natural respiration is completely re-established.

XIII. A small dose of morphia may be injected subcutaneously before chloroform inhalation, as it helps to keep the patient in a state of anæsthesia in prolonged operations. There is nothing to show that atropine does any good in connection with the administration of chloroform, and it may do a very great deal of harm.

XIV. Alcohol may be given with advantage before operations under chloroform, provided it does not cause excitement, and merely has the effect of giving a patient confidence and steadying the circulation.

The commission has no doubt whatever that, if the above rules be followed, chloroform may be given in any case requiring an operation with perfect ease and absolute safety so as to do good without the risk of evil.

2. Mr. Wilson remarks that there may be several objections taken to the unreserved application to man of the conclusions of the experiments of the Hyderabad Commission. In continuation he says:—First, there is the difference which may exist in the action of chloroform on the heart of man and of animals. There is the possibility that the habits of life the taking of stimulants and narcotics, especially the habitual use of drugs like tobacco—for the condition of the vagus centre is shown to be of great importance in relation to chloroform narcosis—may have some effect, if not in altering the behavior of the heart muscle or its innervation, at least in modifying that chain of events upon which depends the absorption and distribution of the chloroform by the blood.

Amongst other points of difference between man and the animals experimented on are the relation of the vital capacity to the size of the animal, and the interference with complete filling of its lungs, resulting from holding of the animal. It has often been shown that the suddenly fatal cases are rare in human subjects in which there is any impediment to the free expansion of the chest—*e. g.*, Clover has pointed out that a phthisical patient is less likely to take a fatal dose of chloroform than one with healthy lungs, because his chloroform absorbing capacity is diminished. Again, it has been noted that few patients die suddenly from chloroform when it is inhaled lying on the side; also, few, if any, sudden deaths are reported in case of ovarian tumors. The explanation of these cases is that the interference with full expansion of the lungs by the position or the presence of the tumor prevents the lungs taking in the necessary fatal dose.

On the other hand, the greater number of the suddenly fatal cases occur in people with healthy chests and large vital capacity. *e. g.*, in reducing dislocations of the shoulder, and in minor operations, such as teeth extraction, especially in those in which the patient, being in the natural upright position, can give the respiratory muscles full play, and completely fill the chest.

Thus it is worth considering if the holding of a struggling animal, such as a dog, might not so interfere with its breathing as to prevent the full dose being taken, especially as the animal would not be likely

to be held in its natural position. There is an indication in the report that, in at least some cases, the holding of the animal did actually interfere with its respiration. If it did so in one case it probably did so in many, especially as a dog's thorax is so shaped that to hold its fore legs together in front of it, would prevent the complete expansion of its chest, and so prevent it suddenly taking a fair dose of chloroform vapor.

In animals, too, we have an absence of the desire to inhale freely. In at least one reported case the wish to inhale the chloroform freely contributed largely to the fatal result.

In chloroform accidents in man, of the very sudden variety, considered to be due to cardiac syncope, a certain set of conditions are present which are difficult to obtain in animals.

The subject is generally young or middle aged, with an expansile chest, the chloroform is willingly inhaled, quietly at first, until semi unconsciousness is produced, when the fauces and glottis are insensitive; then, during struggling, with or without holding the breath, the patient, often in an upright or semi-upright position, and having his arms fixed by the assistants, which gives his respiratory muscles good purchase, gets one or two deep inspirations at the greatest advantage, and so obtains the maximum amount of chloroform.

There is the desire to get under the influence of the drug, the voluntary inhalation followed by the still steady conscious anxiety to inhale more, and then the involuntary deep inspiration, in the natural position in which a deep inspiration can be best taken.

All these are conditions difficult to obtain in experiments on animals, and it is only under such conditions that the supposed cardiac paralysis has been produced in man.

The interval between the stoppage of the heart and the respiration is so short that these points, trivial though they seem, may easily be of importance in modifying the result.

It has always been maintained by the advocates of the syncope theory that it is only under certain circumstances, and by a certain definite combination of factors, that chloroform sufficient in quantity to paralyse the heart can be introduced into the blood, and that this particular



combination of circumstances occurs very seldom—about once in every 1,000 or 2,000 administrations.

Thus, as Dr. Snow pointed out years ago, the effect of chloroform on any given case varies with the amount contained in the blood at any given time.

This depends upon the strength of chloroform vapor exhibited to the patient, the ease with which it is inspired through the glottis, and the depth and frequency of the inspirations; the amount actually absorbed depends upon the condition of the blood (its capacity for chloroform may vary), the time it stays in the lungs, the rapidity of the circulation, and other factors.

The idea was that, by a certain combination of these several factors, the maximum quantity of chloroform was absorbed by the blood in the lungs and hurried to the heart, the next organ in the order of the circulation, not merely distending its cavities with chloroform-saturated blood, but also being distributed by the coronary arteries to every part of its substance, and so causing paralysis. This result is also assisted by the condition of distension of the heart and the venous condition of the blood.

That the arrangement of these various factors—respiration, pulse, etc.—has an important bearing in the action of the drug on the heart, is well shown by these experiments of the Commission. These showed that by varying the methods of administration in different experiments it was possible to make the heart cease beating at intervals of from one to twelve minutes after the cessation of the respiration. It is not impossible that by further variations the time might have been reduced until the stoppage was simultaneous with, or even preceded, the cessation of respiration, and the experiments would have been thus made to accord with certain reported fatal cases in man.

The cases in which the heart ceased soonest after the respiration were cases complicated with asphyxia; that is, cases in which semi-asphyxia was produced, presumably followed by deep inspiration; under these circumstances the heart ceased beating one minute after the respiration stopped. Now it is under conditions similar to these in man, that the so-called cardiac syncope occurs, and it

is by working on these lines that attempts to produce it in animals should be made ; but it appears that the Commission only made some four of these experiments, hardly a sufficient number upon which to base an important statement.

In ordinary practice, the several conditions giving a fatal result from cardiac syncope are combined about once in every two or three thousand administrations. Because the Commission did not obtain it in some 600 attempts they conclude that it cannot exist. This is scarcely reasonable, especially as the bulk of their work was not upon the lines which promised the nearest result, viz., those of deep inspiration after semi-asphyxia.

The manner or means by which the movement of the heart was tested are of some moment, as explaining the discrepancy between the results of experiment and practice. Most of the cases were tested by a needle introduced into the heart, or by opening the chest. These methods will indicate the merest quiver of the heart muscle, movements that would give no indication of their presence to ordinary observation, and movements that would probably be of no functional use, *i. e.*, in no sense contractions. It has been noticed by observers that the heart of animals killed by chloroform shows fibrillary irritability, after the heart muscle, as a whole, is incapable of contraction—a condition similar to this would indicate movement tested by the above, but such movement would be fallacious.

It would be interesting to know the degree of action exhibited by the heart after cessation of the respiration. Was the power of propelling blood retained? If the action consisted only of muscular tremors it would be of little value, and hardly what is understood by action of the heart.

In the second portion of the report it is shown that the essential action of chloroform on the system is to cause a fall in the mean blood pressure. This fall is proportionate to the amount of chloroform inhaled into the system. [It would have been interesting to have known the relation, if any, the condition of the blood pressure bore to the state of anæsthesia.]

This fall in blood pressure bears some relation to the respi-

ration, but what this relation is is not distinctly stated, and the cause of the fall in pressure is also not clearly assigned, except that it is not due to the direct action of chloroform on the heart, and must be due to paralysis of the vaso-motor centre. This is important when taken in conjunction with the following parts of the report (Sec. 3): “ \* \* \* If the chloroform is pushed further, there comes a point not easy to define when the blood pressure and respiration will no longer be restored spontaneously, although the heart continues to beat after the inhalation has stopped.” And also (Sec. 25): “ \* \* \* It is never in any case certain that artificial respiration will restore the natural respiration and blood pressure, *no matter how soon it is commenced* after the respiration stops.”

This exposes a comparatively new and insidious danger in chloroform administration, and one as difficult to treat as the old cardiac syncope. It is quite conceivable that under certain circumstances the dose necessary irretrievably to damage the vaso-motor center may be inhaled with extreme rapidity, and that while the respiration and pulse are still present, the centre may be almost paralysed before much warning has been given.

From a record of fatal cases in man, it appears possible that this paralysis may, in certain conditions, be effected almost instantaneously and before complete insensibility has been produced.

The lowering of blood pressure in the case of a fatty heart cannot be altogether an advantage in chloroform administration. It must, by the efforts the heart makes to keep up the pressure, increase the work of the heart, and at the same time diminish the blood supply to the heart itself.

It is important to note that in all these experiments there are double and treble reactions, which, though they have a beneficial effect in diminishing the amount of chloroform absorbed, are in themselves elements of danger.

Thus, semi asphyxia and inhibition of the heart are elements of safety by preventing the “intake” and distribution of chloroform, but the ultimate result of this is to cause rapid breathing and quick pulse, which by the extra “intake” of chloroform and the quick distribution of that already inhaled, is an element of danger.

This change from a slow to a rapid pulse may be attended with very nearly fatal results, as is shown in Sec. 34, where an animal was nearly killed by a short inhalation from the inhibition of the vagus having been stopped, and a more rapid pulse consequently resulting. This fall in pressure is in itself, in feebly nourished subjects, a source of danger, causing syncope from cerebral anæmia.

Apart from any action which chloroform may have on the heart itself, the experiments made supply abundant reason for a careful observance of the pulse during the administration of the drug, and it is surprising that this point has not been referred to in the practical conclusions.

In the report it is shown that the amount of chloroform inhaled (in the intake) depends upon the respiration, but that the effect of this "intake," the way in which it is utilized, lies with the circulation, with the force and rapidity of the pulse or the reverse.

It is shown that, with a slow pulse, concentrated chloroform vapor can be exhibited with impunity, but with a full, bounding pulse dilute chloroform vapor may be dangerous. These variations occur in practice, from the quick full pulse of a patient with a high temperature to the slow pulse of a patient with jaundice.

As attention to the pulse is so easily managed without neglect of the respiration, and a proper knowledge of the state of the circulation has been proven to be most essential to the intelligent administration of an anæsthetic, it is advisable that the pulse should always be observed; it can, at least, do no harm, and, in conjunction with the respiration is a valuable help, quite apart from any information it gives of the general condition of the patient.

The assistant in charge of the anæsthetic must endeavor to be more than a mere dole out of innocuous doses of chloroform; he should keep himself in touch with the whole condition of the patient all through the operation. To endeavor to narrow his work to mere watching of the respiration is mistaken policy.

If the conclusions of the Commission are accepted in full without reserve, chloroform has no power of paralysing the heart; one danger is removed, but it is replaced by one as great in every respect, viz., par-

alysis of the vaso-motor centre. This may set in very suddenly, with hardly any warning; it is as far beyond treatment as cardiac paralysis, and it is as fatal. If the cardiac paralysis from chloroform does not exist, vaso-motor paralysis must have been the cause of the numerous deaths recorded against chloroform; and how sudden and irremediable this is the reports of fatal cases abundantly testify.

When death occurs from vaso-motor paralysis it is clearly imaginable that the vaso-motor centre may be hopelessly damaged or rapidly reaching that stage, while the pulse is still present and the heart attempting to keep up the pressure. So that for some seconds there may be a deceptive condition in which both pulse and respiration are present, yet a fatal termination is imminent. That this death from vaso-motor paralysis does occur in man is shown by the very rapid running pulse mentioned in some cases as preceding the fatal termination.

The extensive experiments of the Commission have left the chloroform question in the following condition: It was not found possible to directly paralyse or effect the heart by chloroform in some 600 administrations. Death from chloroform is due apparently to paralysis of the vaso motor and respiratory centres—probably one or both of these may be affected. When death occurs it is the result of an overdose of the drug.

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TRENDELENBURG ON OPERATIONS FOR VESICO-VAGINAL  
FISTULA, AND ON THE ELEVATION OF THE PELVIS  
DURING OPERATIONS IN THE ABDOMINAL  
CAVITY.<sup>1</sup>

By the efforts of Nægle, Dieffenbach, Jobert de Lamballe and Simon, this chapter of surgical gynæcology seems to be perfectly closed.

New propositions lay only in the modification of instruments, the position of the patient, suture material, preparation for operation and the after treatment; the principle always remains the same, exposing and refreshing the edges of the fistula through the vagina, closure by

<sup>1</sup>Volkman's *Sammlung Klin. Vorträge*, No. 355.

suture. In most cases a cure by these means can be accomplished and for ordinary cases it is useless to complicate matters.

Alongside of these favorable cases, there are unfavorable ones in which this procedure meets with the greatest difficulties and notwithstanding numerous operations no result is obtained. Winckel estimates that one-tenth of all cases of vesico-vaginal fistula remain uncured.

To the unfavorable cases belong the vesico-utero-vaginal fistula, and the uretero-vaginal fistula, specially the latter. There are also some cases of pure vesico vaginal fistulæ which present so many difficulties as to endanger the success of the operation. Cicatricial contraction of the vagina and adhesions to the pelvis making it impossible to draw away the uterus from the vesico-vaginal wall. Proximity of the uterus prevents a proper paring of the edges of the fistula, or large defects and the unfavorable position of the same close to the urethra does not allow of close apposition of the edges of the wound without producing considerable tension. These difficulties may be so great that the fistula may only be partially but not completely cured.

A partial cure does not improve the patient's condition, and finally kolpoplekisis has to be resorted to, which though curing one evil brings on another.

The writer states as a result of his experience :

1. That fistulæ which cannot be easily reached through the vagina can be easily operated on through the bladder.
2. Fistulæ which cannot be closed by bringing the edges together can sometimes be closed by covering them with a flap from the posterior or vaginal wall.

It is well known now, thanks to the advances in surgery, that large wounds of the bladder heal rapidly; and the elevation of the pelvis has given us an easy means by which, once the bladder has been opened, it is as easy to operate in this viscus as through the vagina, so nothing is easier now than to close a fistula, the walls of which can only be reached with difficulty through the vagina by operating on it from inside of the bladder.

The first attempts of Trendelenburg in this direction were in 1881 and 1884, and have attracted hardly any attention, only König has referred

to them casually in speaking of the elevation of the pelvis, which he says gives such a good view of the interior of that bladder that the finer vesical operations can be attempted with ease.

If a patient be placed on the operating table in such a manner that the symphysis pubes forms the highest point of the trunk, and the trunk forms an angle of  $45^{\circ}$ , then all the solid abdominal contents will fall towards the diaphragm, and the small intestines will fall out of the pelvis.

If an incision be now made in the hypogastric region, and the recti muscles as well as the fascia behind them divided air rushes immediately into the pre-vesical space, pushes the peritoneum backward and there is a large opening in which the anterior wall of the bladder with the reflection of the peritoneum is plainly visible, and now the bladder may be incised with perfect safety, without it being necessary to distend it with water.

Trendelenburg advocates elevating the pelvis in all intra-peritoneal, as well as in all operations in the pelvis.

If the bladder be opened (in an elevated pelvis) by a transverse incision parallel to the reflection of the peritoneum, and the sides of the incision retracted, the whole of the interior of the viscus will be brought to view, and if a fistula exists it can be readily seen. It is now perfectly easy to freshen the edges of the fistula and bring them together by sutures. The best sutures are silk-worm-gut, and they should be so passed as to be tied in the vagina, for if tied in the bladder urinary concretions form on them, and give rise to after trouble.

Catgut sutures may be used and tied in the bladder, for they will be come absorbed along the stitch track and the knot will be voided with the urine.

The fistula being closed in the above indicated manner, it remains to close the bladder wound, and this is accomplished by sutures which secure the most perfect apposition possible, and over these a row of Lembert's sutures. An opening is left in the center for drainage, in which a T-shaped tube is introduced. Then the external wound is closed except at three points, each angle and the centre. Through the central opening the vesical drainage tube passes, through others the pre-vesical space is drained by means of strips of iodoform gauze.

The patient is then placed in a horizontal position and the bladder thoroughly washed out, and an iodoform gauze tampon is placed in the vagina, and the patient put to bed and kept on her side, she being changed from one to the other side every two or three hours, to relieve the trochanters from pressure. The suprapubic wounds are treated openly and the dressings frequently changed. If the bladder tube should become stopped up by blood clots, it is carefully washed out; if cystitis should set in, the bladder should be carefully washed out at necessary intervals.

From the fifth day onwards the patient may from time to time lie on her back; from the ninth to the twelfth day the bladder tube is removed and about twenty days later the integrity of the viscus is perfectly restored.

So long as the urine remains acid the chances of the bladder healing without forming a fistula are excellent.

The drainage of the bladder for the first two weeks is the most important part of the operation.

Trendelenburg does not approve of a partial resection of the symphysis in order to get a better entrance into the bladder.

Closure of a vesico vaginal fistula by flap transplantation has already been attempted by Jobert, Roux, Wutzer and others, though no case of cure is reported in the older surgical literature.

Trendelenburg advises in those cases of fistulæ which have resisted the ordinary operative form of treatment, to try and close them by a flap and pedicle taken from the posterior vaginal wall, and sewn in such a manner that a pedicle remains, alongside of which some urine escapes. When the flap has been firmly healed in the fistulæ its base is cut off and used to close the remaining opening, and to prevent any vesical tenesmus or infiltration of urine; a suprapubic cystotomy is done at this time.

The flap usually heals thoroughly in the fistula before the bladder tube is removed.

Trendelenburg did this operation in one case some years ago, and since then the woman has borne three children and has had no recurrence of her trouble.

He looks upon kolpoplekisis, or obliteration of the vagina as a barbarous proceeding which should only be used as a last resort.

F. C. HUSSON



## INDEX OF SURGICAL PROGRESS.

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### GENERAL SURGERY.

**I. The Fatal After-Action of Chloroform.** By DR. OSTER-TAG. The author formulates his conclusions as follows: 1. After prolonged inhalation of chloroform, fatty degeneration of different organs, especially of the heart, liver, skeletal muscles, kidneys, and stomach occurs in animals of widely-different species. 2. The fatty degeneration is the result not only of the action on the blood, affecting the structure of the red blood-corpuscles; also a direct local action on the tissue-cells themselves. 3. Certain individuals show such great susceptibility to the action of chloroform by inhalation that they rapidly succumb to its influence. 4. The fatal after-effect of chloroform is attributable to paralysis of the heart, and it is evident by an anatomical degeneration of the myocardium, although in certain cases this may only with difficulty be detected, and to a gradual accumulation of carbon dioxide in the blood.—*Deutsche Medicinal Zeitung*, Jan. 16. 1890. *Therapeutic Gazette*, March 1890.

**II. The Antiseptic Value of Zinco-Cyanide of Mercury.** By Sir JOSEPH LISTER (London). At a meeting of the Medical Society of London the author reported that he had for a year been using in his wards at King's College Hospital a dressing that he recommended as the most satisfactory he had ever met. Upon repeated trial he had found a double cyanide of zinc and mercury to possess most important antiseptic properties. In the proportion of  $\frac{1}{5000}$  it kept blood-serum perfectly free from the development of organisms for eighteen days in spite of potent septic inoculation. Dressings were prepared by diffusing this "zinco-cyanide of mercury" in water, with a little glycerin added to fix it and prevent it from dusting out. In view of the very

slight solubility of the double cyanide in serum, some of the very soluble cyanide of mercury was associated with it. Some admirable results were got with this "cyanide gauze," but it was found to cause irritation of a peculiar kind, and suppurations also sometimes occurred at a late period of the case, such as Sir Joseph had never been accustomed to with carbolic dressings. It was found that this could be prevented by first saturating the gauze with the double cyanide and then putting it into a solution of starch. This fixed the particles of the cyanide most effectually in the gauze, subsequently the double cyanide and starch were prepared with sulphate of potassium; in this way the mixed salts could be powdered and easily diffused in water. This compound should be moistened before use with a  $\frac{1}{4000}$  solution of sublimate, so as to destroy any organisms there might be in the dressing. The layer destined to be put next the skin is washed in a solution of carbolic acid; this washes out the sublimate. By this means Sir Joseph Lister said he had obtained perfect results in practice in wounds of every description.—*London Medical Recorder*, November 20, 1889

JAMES E. PILCHER (U. S. Army).

### III. Are our Common Dry and Impregnated Dressings Sterile and Can They Sterilize the Secretions of Wounds?

By EDWARD EHLERS. The writer has, like v. Eiselberg and Schlange, made bacterioscopic investigations of various antiseptic dressing-materials. Without going into details we merely direct attention to the results of these investigations:

1. Antiseptically prepared dressing materials, which are dried and kept in a dried state, cannot be regarded as sterile on account of the impregnation.

2. One should never depend entirely upon the impregnation, but the raw material should be boiled or steamed.

3. If one will use dry materials then they should be sterilized after drying, by some dry process.

The impregnated materials cannot be sterilized by means of steam as the antiseptic would be carried away by the vapor. The use of antiseptic dressings in a dry state is essentially a limited one on ac-

count of the volatility of several antiseptics; iodoform and salicylic acid preparations cannot be sterilized by heating at all, carbolic acid preparations only with difficulty; the corrosive sublimate preparations, however, may be best sterilized by heating.

The writer sought to obtain a sterilization of raw iodoform by heating the powder in closed glasses for an hour at 85-90° c. In some of these experiments bacterioscopic examination showed the result to be satisfactory.

With regard to the capability of our ordinary corrosive sublimate dressing materials to sterilize septic fluids secreted from wounds, he found that sublimate gauze containing 4% of this antiseptic *did not possess this property at all*. Carbolized gauze (20%) gave a little better yet an entirely uncertain result. "But," says the writer in closing, "if the asepsis of our dry dressing materials be uncertain and entirely accidental, and the antiseptic action a minimal one, why do we use an antiseptic preparation?"

He recommends the procedure long since used in v. Bergmann's clinic of sterilizing the unimpregnated materials, by means of steam; a similar procedure has also been used for several years by Prof. Bloch in Copenhagen.

**IV. On Remedies for Neutralization of the Tetanic Virus and the Surgical Prophylaxis of Tetanus.** By G. SORMANI (Naples). In an earlier series of experiments published in August, 1889, Sormani found that iodoform was one of the most energetic disinfectants of the tetany producing virus, and that iodoform and an acid (20%) solution of corrosive sublimate were similar in their action. A second series of experiments has shown that also chloral, chloralium, camphoratum and chloroform had a similar power, while camphor and spiritus camphoratus had no favorable action. Since then Prof. Mazzuschelli has used iodoform (locally) in two cases which in and towards the end of May, 1889, came under treatment.

In one case a girl while working in a garden with a spade inflicted upon herself a large torn wound in the calf of the right leg. Eight days after tetanus made its appearance and she was taken into

the hospital at Pavia. After excision of the necrosed portion the wound was cleansed with a 2% sublimate solution, dusted over with iodoform and chloral hydrate given internally. The patient died twelve hours later. In the other case, the patient had run a splinter into her foot between the great and second toe while following a path barefooted over a field. Six days later tetanus made its appearance, the splinter was removed, and treated the same as the preceding case; death after four days, ten days after the injury.

In the first case Sormani inoculated two rats and one rabbit with the tissue which was removed from the wound before dusting with iodoform; all three died from tetanus forty-eight, seventy-two and ninety-six hours after. Two rabbits inoculated with a piece from the wound after the death of the patient remained alive. In the second case a piece of iodoformized tissue and one from the tissues lying more deeply were used for inoculation of two rats, which however remained alive. A culture glass filled with agar which was inoculated with a piece of the wound-tissue remained sterile; another inoculated with a piece excised more deeply developed staphylococci. The Professor concludes from these and further experiments that where tetanus is already developed iodoform is not able to prevent its further course but may neutralize the virus on the surface of the wound. —*La Riforma medica di Napoli*, 1890, Jan. 11-13.

**V. On Carbolic Acid Injections in Tetanus.** By BACCELLI (Rome). Baccelli used subcutaneous injections of carbolic acid and indeed 1 cg. every hour. In 1887 he cured a grave case and now he has another such a one under treatment, where the injections have produced such an improvement that recovery is beyond a doubt. A similar favorable result is communicated in No. 18 of the *Riforma medica*, 1887.—*Riforma medica*, Jan. 25, 1890.

**VI. Tuberculosis of the Skin, Probably due to Vaccination.** By K. G. SENNANDER. The patient, a student of philosophy, 35 years old, presented tuberculosis of the skin of the right upper arm. The lesion had developed after the first vaccination, and later

extended over a large part of the upper arm. After repeated curetting and cauterizing the place healed over finally after skin grafting by Thiersch's method.—*Upsala Läkareförenings Föerhandlingar*, Bd. XXV. Hft. 1 and 2.

F. H. PRITCHARD (Boston).

**VII. Pirogovian Therapeutics.** By PROFESSOR NIKOLAI F. ZDEKAUER (St. Petersburg, Russia). Professor Zdekauer gives a highly interesting review of some remedies which have been systematically used by his intimate friend, the great Russian surgeon, Nikolai Ivanovitch Pirogoff.

1. *Camphor* was his favorite remedy for erysipelas. According to his enormous experience, it is indicated in, *a*, cases characterized by typhoid state with pallor and prostration: and *b*, in erethic state with facial congestion and tumor, dry tongue, quickened pulse, burning heat flashing over dry skin, heaviness about the head and mental confusion. The remedy was given internally, 2 grains every 2 hours, until the appearance of a mild peculiar "camphor delirium." In typhoid cases hot infusion ("tea") of valerian was simultaneously administered; in erysipelas of the head the first doses of camphor were combined each with  $\frac{1}{2}$  grain of calomel.

2. *Sulphate of quinine* was employed (in moderate doses) in habitually recurring erysipelas, as well as in severe malarial fever (20 grains 2 times a day, always during the stage of sweats).

3. *Tincture of iodine*, in the shape of injections, was resorted to in all cases of dropsies of serous and synovial cavities. Internally, in conjunction with restricted diet, it was given pregnant women with narrow pelvis in order to retard the foetus growth and eo ipso to make parturition easier.

4. *Nitrate of silver* (ointment) proved very useful in cases of chronic induration of glands; and in the first stage of *tumor albus*.

5. *Ergotine* was successfully administered by him (since 1850), both internally and externally, in cases of parenchymatous hæmorrhage.

6. *Neutral acetate of lead* (finest powder, locally) gave best results in granular conjunctivitis.

7. *Nitrate of lead* (lotion) was found exceedingly useful in bad chronic ulcers.

8. *Radix sumbul* (containing a stimulant and antiseptic essential oil having a musk-like odor) was successfully employed both internally and externally (in the shape of injections) in exhausting caries and bad ulcers with hectic fever, the remedy removing prostration and colliquative diarrhœa, controlling suppuration, cleansing ulcers, etc.

9. *Opium* (2 grains, several times daily) was given internally in phlegmonous erysipelas in dipsomaniacs.

10. *Strychnine* ( $\frac{1}{35}$  grain daily, internally) proved effective in intractable sciatica.

11. *Chlorate of potassium*, internally and externally (as a gargle, made of  $\frac{3}{4}$  of the salt to  $\frac{3}{4}$  vj aq), was found of service in enteric fever, associated with an "aphthous condition of the oral and intestinal mucous membrane."

12. *Creasote* was with best results applied locally (paintings) in malignant or gangrenous anginas.

13. *Cold packs* and *ice-bags* were employed in refractory rheumatals and acute articular rheumatism.

14. *Mud-baths* (Hapsal) proved highly beneficial in scrofulous caries and other affections of bones and joints in scrofulous children.—*Transactions of the Pirogavian Russian Chirurgical Society*, 1890, Vol. VII. pp. 70-76.

VALERIUS IDELSON (Berne).

## REVIEWS OF BOOKS.

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TEXT-BOOK ON CYSTOSCOPY—ITS TECHNIQUE AND CLINICAL IMPORTANCE. By MAX NITZE, Berlin. Pages, 329. Weisbaden: T. F. Bergmann. 1889.

A little more than two years have elapsed since cystoscopy, this new branch of surgical diagnostics, has been established in its modern shape, and a text-book on this subject has already been published, written by that author, who has the greatest experience and merits in this line. The book will be welcome to the beginner as well as to the more experienced one in this interesting and important method of examination. The former finds in it a thorough, fascinating introduction, the latter many valuable hints and facts which make him understand better what he has already seen himself; he further gets a great number of practical rules how he may best overcome, even in desperate cases, such obstacles, which seem to prevent the doctor from making a cystoscopic examination. We are instructed how we may succeed with perseverance and tact, in the gentlest manner for the patient "to view the interior of the bladder." Very satisfactory is the effect of the truthful reproduction in text and cuts of exactly what has been seen without any ornamental addition or any exaggeration. Everybody who has practiced cystoscopy will admit this. Of course even Nitze is not yet able to give a correct pathological anatomical explanation of every picture he has seen. But he gives at least the most probable one. His text book does not at all claim to treat a perfectly developed branch of medical science. It only is the author's intention "to give a structure, the perfect complexion of which can only be realized by the united work of numerous investigators." The main fact is that cystoscopy to-day enables us after some experience—and this, says Nitze, is absolutely necessary—to obtain a clear view of the interior of the morbid bladder even though it be a very irritable one. That such satisfactory exploration is really possible is, as the reviewer

knows, by personal experience, not yet generally admitted amongst surgeons.

Nitze divides his book into three parts.

Part I explains in 124 pages the history and technique of cystoscopic examination.

After having given a short history of the development of endoscopy and the changes in the relative size, length and position of bladder and urethra produced by the manipulations connected with cystoscopy, the author dwells at length on the importance of the two new principles in this new method of examination invented by him, viz.: the introduction of the light itself into the cavity to be examined and the optic apparatus which magnifies the spot coming into view. The two devices combined effected the immense progress which has been made. There is no doubt that also the original cystoscope which was presented by Nitze to the Imperial Society of Vienna Physicians in 1879 gave splendid pictures, as a small number of cases, reported by different authorities, prove. But in using the incandescent platinum wire which gave the light, too many expensive and unhandy accessory apparatuses were required. The original instrument therefore did not come into general use. Edison's lamp, of a very small caliber, so-called mignon lamp, determined a radical change. The cystoscope in its newest construction is simple, handy and cheap, not larger than an ordinary silver catheter, No. 22-23 French scale. The optic apparatus which, coming into sight, enlarges the area of the bladder brought into the field of vision and at the same time magnifies it, consists of a special combination of lenses. This optical apparatus has been called a "telescope," but the term does not adequately describe it. Its properties and usefulness are dwelt upon at length in the text. (The peculiar combination of the different parts will probable make photography of the pictures possible. Nitze makes a few remarks in this respect at the conclusion of his work). The three different cystoscopes—No. 1 is mostly used and the most important one; No. 2 is for the fundus of the bladder, especially useful in cases of hypertrophy of the prostate gland; No. 3, which can still be improved, for the internal orifice of the urethra and the surrounding portions of the bladder, and the present accessory apparatus (battery and wire with handle)—are then fully described and a number of important rules in regard to keeping and preserving the instruments given. The eighth (last) chapter of the first part of the book treats the "technique of cystoscopic examination." It would surpass the limits of this review if we would try to give a short report of what is given and worth knowing. For



such a purpose the book itself must be studied. Here it must be sufficient to state that in nearly every case we can fulfill the three main requirements for a successful cystoscopic examination, viz.:

1. We must not dim prism and lamp in introducing the instrument into the bladder.

2. The caliber of the urethra must be large enough to allow of the passing of the cystoscope (No. 23 French) and also the capacity of the bladder sufficient (five ounces).

3. We must be able to have a transparent fluid in the bladder.

The experienced doctor has means at his disposal (if original) to overcome any obstacles which may be in the way. There are 5 exact motions of the cystoscope in the bladder, demonstrated by cuts which will bring into sight every spot of the interior of the bladder with mathematical exactness. With the help of cocaine-anæsthesia we can make cystoscopy painless, even in very irritable bladders or patients. Rarely a preliminary hypodermatic injection of morphia is required, still more rarely narcosis.

Part II of the book (100 pages) deals with the cystoscopic appearance of the healthy and of the morbid bladder. Whoever has already had the satisfaction of inspecting the interior of the healthy bladder will find that the pictures in Nitze's book admirably reproduce and confirm his own experience. The novice who has not yet had this satisfaction will by the inspection of these pictures and the perusal of the book learn many facts of which he had been previously ignorant. He will read of the coloring (pale, yellowish red, rarely pink) and surface of the mucous membrane of the bladder; of the fine ramifications of small blood vessels similar to those that we see on the retina with the ophthalmoscope; of the peculiar picture of the fold of mucous membrane around the internal orifice of the urethra; of the glistening bubble of air at the vertex, intentially injected into the bladder for easier localization. But the reader's greatest interest will certainly be aroused by Nitze's clear description of the endoscopic picture of the fundus of the bladder, the method of the ureters and their fold of mucous membrane. Many will certainly feel eager to observe once themselves how the urine, descending from the kidneys, enters the bladder with a rush at intervals of from 30 to 60 seconds—sometimes as long as five minutes—producing whirls in the water that had been injected into the bladder; how at the same time the mouth of the ureters first slowly contracts to the size of a very small groove and then again gradually enlarges to its former size, at this moment suddenly giving exit to the urine; how the mouth of the ureter remains in this middle

position for a short while until the recurrence of the movement determines a repetition of the phenomena;<sup>1</sup> how the displacement of the intra-abdominal organs during respiration reflects upon the vertex of the bladder (downward and upward rolling of the injected bubble of air); how the same spot of the wall of the bladder, especially on either side, shows rhythmic pulsation (transmission of the pulse of the external iliac artery). Among *pathological* processes the author treats first the cystoscopic picture of catarrh of the bladder. As in other organs catarrh of the bladder manifests itself by redness and œdematous swelling of the mucous membrane and in the production of a catarrhal secretion. The pictures show a great variety and are not distinctly differing from each other in accordance with the various degrees of catarrh. In a few rare cases a circumscribed portion of the inner surface of the bladder presented the symptoms of very marked catarrh, the other part of the vision being perfectly healthy. Nitze further states at length what he has seen in tuberculosis of the bladder and cases suspicious in that respect. One has not yet succeeded in establishing a characteristic picture for the tuberculous affection.<sup>2</sup> It is evident that we can plainly see stones and foreign bodies in the viscus,

I am of the opinion, according to my own observation, that this phenomenon takes place in exactly the opposite way. When the urine begins to enter the bladder the mouth of the ureters with its elevation of mucous membrane keeps its position or is sometimes pressed a little forward. Only at the end of each conveyance of urine into the bladder, the orifice is drawn inward and assumes with its nearest adjacent part, the shape of a funnel. As soon as the last drop of urine has been passed into the bladder the mouth of the ureters returns to its former place. In regard to probable explanation, see my article "On Cystoscopy, etc.," *N. Y. Medical Journal*, 1888, p. 430.—W. M.

<sup>2</sup>Only a few days ago I had occasion of performing cystoscopy in a patient of Dr. Le G. N. Denslow, of St. Paul, whose symptoms excited suspicions of tuberculosis. I saw a beautifully clear and instructive picture. Immediately above the somewhat swollen mouth of the right ureter and its elevation of mucous membrane, there was an ulcerated spot of about the size of two silver dollars. Purplish-red, broad elevations (evidently the inflamed fibres of the detrusor muscle) crossed each other in different directions. Small particles of snowy shining mucus, adherent to their surface, floated in the fluid. The depressions between these elevations were, of a lighter hue, also covered with numerous flakes. In between them numerous very small and larger sessile growths of grayish coloring were plainly visible, a few about as large as a pin's head, undoubtedly miliary-tubercles. On one spot a small rhomboid-shaped dark-red spot could be seen. The entire other inner surface of the bladder was perfectly normal, of grayish-white color, rather anæmic, corresponding to the condition of the patient. As the microscopic examination showed an abundance of tubercle-bacilli in every specimen of urine prepared, the diagnosis "tuberculosis of the bladder" is the correct one beyond any doubt.

make out their mobility, estimate their size after some experience and observe their shadow on the wall of the bladder. Sometimes the larger size of the bodies or their position in the groove behind the swollen prostatic gland for instance, as also the morbid condition of the bladder produced by their pressure, causes difficulty in regard to a correct diagnosis. By closely following a few practical rules we can overcome such difficulties in nearly every instance.

But cystoscopy celebrates its greatest triumph in establishing the diagnosis of tumor of the bladder. If the urine is clear, no preparatory treatment (washing the bladder) is required. The cystoscope is immediately introduced at a time when the bladder probably holds a sufficient quantity of urine for examination (about 5 ounces). Thus a hæmorrhage, which might arise in consequence of the washing, will best be avoided. If hæmaturia is just present at the time of consultation, the doctor should not yield to the patient's demands and try to get the bleeding under control by irrigation, but rather wait until it has stopped. This usually will occur soon. Immediate success in the first attempt at cystoscopy will be the probable reward. If an infectious catarrh of the bladder has already set up, a condition which is mostly found in these cases, grave obstacles will be sometimes encountered. Frequently they will be overcome by patience and careful handling, now and then they will prevent the examination. As this accompanying catarrh of the bladder, which so terribly torments and weakens the patients, is *in all cases* carried into the bladder by the doctor with the sound or catheter, Nitze postulates to absolutely avoid the introduction of an instrument into the bladder of patients, where a tumor of the bladder is suspected. The cystoscope must be the first instrument in future which is resorted to in these cases. It is selfunderstood that we will always apply strict antisepsis in preparing the patient and in performing the cystoscopic examination. At the conclusion of this interesting chapter a short report of twenty cases of tumor of the bladder will be found, being diagnosed by Nitze with his cystoscope. All their characteristics were verified by epicystotomy or post-mortem as previously diagnosed.<sup>1</sup>

<sup>1</sup>Three weeks ago I was called in by a colleague to see a man, æt. 53 years, who had constantly passed bloody urine since about six months, without even consulting a doctor. He only suffered from frequent forcible micturition and now and then pain in the glans, otherwise he felt comfortably. Repeated careful chemical and microscopical examination only showed blood and mucous cells, never a particle of a new growth. Bimanual palpation was very difficult and also promised no result on account of the patient's corpulence and marked hypertrophy of the prostate. I there-

In the following chapter, "Hypertrophy of the Prostate," Nitze puts special stress upon the appearance of the fold of mucous membrane surrounding the internal orifice of the urethra, which can be perfectly viewed with the cystoscope. Nitze believes that he will be able, in course of time, to diagnosticate the species of hypertrophy in the picture by seeing the changes of this fold. In many cases it will be desirable to corroborate the result of the examination with the cystoscope No. 1, also by the cystoscope No. 3.

Part III of the book, closely resembling Nitze's former treatise (v. *Langenbeck's Archiv.*, Vol. 36, III), speaks of the importance of cystotomy in regard to the diagnosis and treatment of urinary and bladder diseases. An objective comparison of the former methods of examination of the male bladder (as chemical and microscopical analysis of the urine, examination with sounds, combined rectal palpation, as proposed by v. Volkmann, digital exploration of the bladder after median section, epicystotomy, etc.) with cystoscopy shows that the latter is the most perfect one, that it is greatly superior to all of them, because it promises the most reliable result. It is at the same time the gentlest method in regard to the patient. It is safe to say that cystoscopy has the same importance for the diagnosis of bladder diseases as laryngoscopy has for those of the larynx. It should, therefore, not be applied as a "last resort," as one frequently hears said, but it should rather be the *very first*, before the bladder has been infected by intra-vesical useless manipulations and before obstacles have arisen to render mirror-inspection impossible. Once more the medical colleagues, therefore, are earnestly requested to stop introducing a sound

fore immediately resorted to cystoscopy. As a hypodermic of morphia with local cocaine-anæsthesia did not quiet the irritable bladder, the patient was narcotized. Now we saw in brightest illumination a round, sessile growth with an uneven surface of about the size of a cherry on the left wall of the bladder, about one inch above the mouth of the left ureter. I very plainly saw that blood was oozing out of its surface. The other portion of the bladder appeared to be healthy; there were symptoms of a slight catarrh. The diagnosis of tumor thus having been made, epicystotomy was proposed to the patient. The operation was performed in the posture and with the help of the cross incision, as proposed by Trendelenburg. The bladder having been incised the growth was found on the spot localized before; it presented all the characteristics as formerly diagnosed with the cystoscope. The tumor was grasped with a long Muzzen's forceps, pulled forward and cut with the adjacent parts of the wall of the bladder with the knife by an ellipsoid incision. The base was burned with Paquelin's thermo-cautery. Drainage of the bladder with the Trendelenburg tube in latero-abdominal position; the lower two-thirds of the wound in the bladder were closed by catgut sutures. Patient made an uninterrupted recovery. He is already out of bed.—W. M.

or catheter into the bladder in cases of obscure urinary trouble in future, but to let these patients primarily be examined with the cystoscope, before any other local examination has been tried. Only if there is ample reason for suspecting stone in the bladder, sounding should be resorted to at once.

The advance in the diagnosis of the various urinary and bladder diseases, made by the use of the cystoscope up to date is immense. The one very important part deserves to be mentioned first: That we are able to decide with absolute certainty whether the bladder be healthy or morbid, and thus definitely localize the trouble. For if it be proved that the seat of the disease is *not* in the bladder, then it must be looked for somewhere else, especially in the upper urinary passages, most probably in the kidneys. Furthermore, we can learn to see out of which ureter purulent or bloody urine escapes, whether in a case of disease of one kidney the other continues to perform its functions.

The more thorough knowledge of the various forms of catarrh of the bladder will demand a modified treatment. The diagnosis of ulcerations of the wall of the bladder, especially those of a tuberculous nature, will force the knife into the surgeon's hands to perform suprapubic cystotomy, to scrape the ulcers under the guidance of the eyes, and burn their base, or to make a radical extirpation which includes the wall of the bladder, according to Schatz. Foreign bodies can not only be diagnosticated, but plainly localized, and therefore removed with absolute certainty by a proper method. If after litholapaxy any detritus remains in the bladder, the cystoscope will find and localize it, and therewith greatly facilitate its removal. The only one, but most important reproach to litholapaxy has thus lost its foundation. Litholapaxy, with the help of cystoscopy, will forever rank highly amongst the operations for stone. It is well known that now and then even a very experienced hand will fail to detect a stone with the sound. By using the cystoscope such cases will not occur any more. Diverticula are very easily demonstrated. If a catheter, with a curvature adapted to their locality, is introduced into their cavity, they may be washed out, and the catarrh of the bladder, created by them, improved. Their presence would require a very careful distension of the bladder for the suprapubic incision.

But before all, the treatment of tumors of the bladder has been benefited by cystoscopy. Their soft structure makes it impossible nearly in all cases, to diagnose them with the sound or bimanual palpation. The cystoscope enables us to view them in the brightest il-

lumination. To remove benign, pedunculated growths, Nitze proposes, not to incise the bladder, but to crush the growth, when localized, with a long forceps, introduced per urethram. The curvature of the forceps must correspond with the insertion of the growth<sup>1</sup>; the operation may be performed in one sitting or more. The result will be easily controlled by repeating cystoscopy after some time. If the technique of epicystotomy continues to be improved, and if this operation is not looked upon any more as a dangerous one whatsoever, Nitze would prefer it in all cases to the procedure just described. Recently von Antal diagnosed a polypus of the bladder with the cystoscope and removed it with a long forceps by way of the urethra. He has published the case in his new treatise (*Pathology and Treatment of Urethra and Bladder*, Stuttgart, 1888, p. 401) without giving credit to Nitze, who first recommended this method. (A second case of this kind is published by E. N. Fenwick, of London, *Brit. Med. Jour.*, Sept. 22, 1888.—W. M.) Such cases will multiply "if the general practitioner begins to realize the eminent pathognomonic importance of a spontaneous hæmaturia."

WILLY MEYER.

<sup>1</sup>A very good instrument which has recently been constructed by Dr. G. G. Hopkins, of Brooklyn, can, as it seems, be well used for this purpose. A new curette for the male bladder. *Brooklyn Medical Journal*, January, 1890.







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